ORDER NO. KMF0012475C2

Service Manual

Multi-Function Plain Paper Facsimile

KX-FM189BL / KX-FM189S

(for Belgium)

(for Sweden)

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

When you note the serial number,write down all 11 digitals. The serial number may be found on the bottom of the unit.

1. INTRODUCTION

1.1. TRANSLATION LISTS

1.1.1. LCD MESSAGES (for KX-FM189S)

ENGLISH	SWEDISH														
.QUICK SET UP	1	.	S	N	A	B	B		I	N	S	T			
.FEATURE LIST	2	.	K	O	N	F	I	G		L	I	S	T	A	
.EASY DIAL	3	.	S	N	A	B	B	S	Ö	K	N	I	N	G	
.FAX RECEIVING	4	.	T	A		E	M	O	T		F	A	X		
.COPIER	5	.	K	O	P	I	E	R	A						
.REPORTS	6	.	R	A	P	P	O	R	T	E	R				
CHECK FILM			K	O	N	T	R	.	F	I	L	M			
CHECK MEMORY		K	O	N	T	R	.	M	I	N	N	E	T		
CHECK PAPER		K	O	N	T	R	.	P	A	P	P	E	R		
COVER OPEN	L	U	C	K	A		Ö	P	P	E	N				
PLEASE WAIT						V	Ä	N	T	A					
CHECK DOCUMENT	K	O	N	T	R	.	D	O	K	U	M	E	N	T	
1.SYSTEM SET UP	S	Y	S	T	E	M		S	E	T		U	P		
CALL SERVICE	K	O	N	T	A	K	T		S	E	R	V	I	C	E
CALL SERVICE2	K	O	N	T	A	K	T		S	E	R	.	2		
EASY DIAL FULL	S	N	A	B	B	S	Ö	K	N		F	U	L	L	T
FAX IN MEMORY		F	A	X		I		M	I	N	N	E	T		
FAX MEMORY FULL	F	A	X		M	I	N	N	E		F	U	L	L	T
MEMORY FULL		M	I	N	N	E	T		F	U	L	L	T		
MODEM ERROR				M	O	D	E	M	F	E	L				
NO FAX REPLY	I	N	G	E	T		F	A	X		S	V	A	R	
NO TAD GREETING		I	N	G	E	T		S	V	M	E	D	D	.	
NO TRNS-GREETING	I	N	G	E	T		T	E	L	S	V	M	E	D	D
PAPER JAMMED		P	A	P	P	E	R	S	S	T	O	P	P		
PC FAIL OR BUSY		P	C		F	E	L	/	U	P	P	T	.		
POLLING ERROR			P	O	L	L	I	N	G	F	E	L			
REDIAL TIME OUT	Å	-	U	P	P	R	.	T	I	M	E	O	U	T	
REMOVE DOCUMENT		A	V	L	Ä	G	S	N	A		D	O	K	.	
TRANSMIT ERROR	Ö	V	E	R	F	Ö	R	I	N	G	S	F	E	L	
UNIT OVERHEATED	E	N	H	E	T		Ö	V	E	R	H	E	T	T	D
YOUR LOGO	D	I	N		L	O	G	O							

1.1.2. ERROR CODE TABLE (for KX-FM189S)

ENGLISH	SWEDISH
OK	OK
PRESSED THE STOP KEY	TRYCK PÅ STOP KNAPPEN
DOCUMENT JAMMED	DOKUMENT FASTNAT
NO DOCUMENT	INGET DOKUMENT
THE COVER WAS OPENED	PAPPER SLUT
CANCELED	AVERUTEN
ERROR-NOT YOUR UNIT	FEL-EJ DENNA ENHET
COMMUNICATION ERROR	KOMMUNIKA ATIONSFEL

1.1.3. BUTTON NAME (for KX-FM189S)

ENGLISH	KX-FM189S
AUTO ANSWER	AUTOMOTTAGN
CALLER ID	NR PRESENTATION
COLLATE	SORTERA
COPY/START/SET	FAX / START/ LAGRA
DIGITAL SP-PHONE	DIGITAL HÖGT. TELEFON
DIRECTORY PROGRAM	PROGRAM
EASY DIAL	SÖKNING
ERASE	RADERA
HELP	HJÄLP
MENU	MENY
MUTE	SEKRETESS TANGENT
PLAY MESSAGE	SPELA UPP MEDDELANDE
QUICK SCAN	MINNES SÄNDNING
R	R
RECORD	INSPELNING
REDIAL/PAUSE	ÅTERUPPR./PAUS
RESOLUTION	UPPLÖSNING
STOP	STOPP
VOLUME	VOLYM
SLOW	LÅNGSAM
QUICK	SNABB

1.2. SAFETY PRECAUTIONS

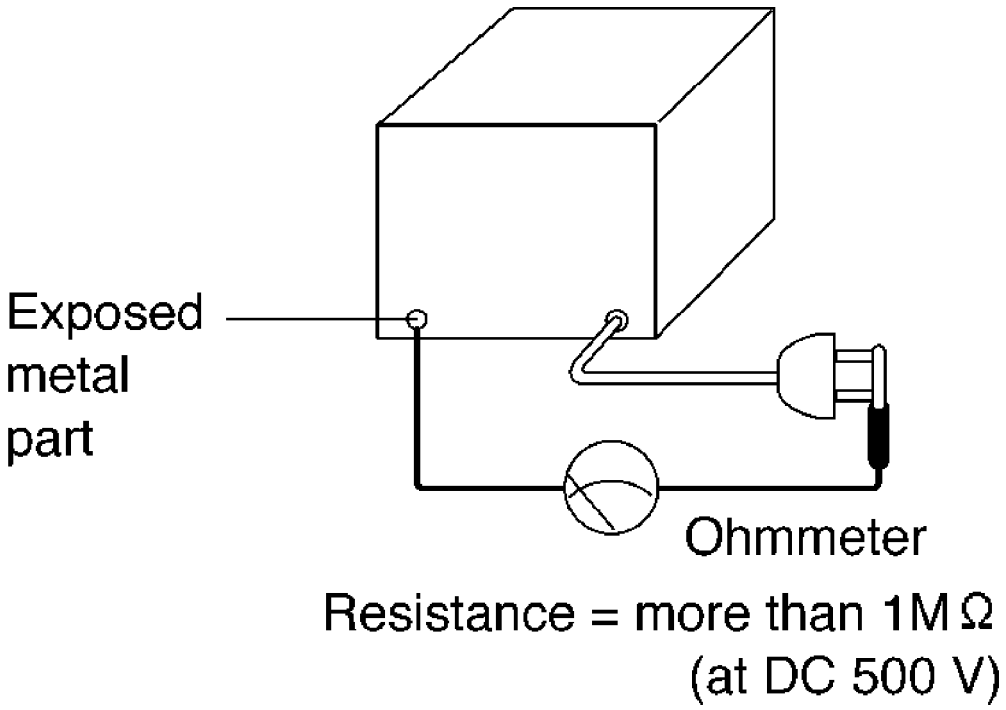
1. Before servicing, unplug the AC power cord to prevent an electric

shock.

2. When replacing parts, use only the manufacturer's recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.3. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.



1.4. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic part's boxes with aluminum foil.

2. Ground the soldering irons.

3. Use a conductive mat on the worktable.

4. Do not touch the IC or LSI pins with bare fingers.

1.5. BATTERY CAUTION

CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution:
Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells

should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.
Recommend Type Number:
CR2032 (BAT501) Manufactured by MATSUSHITA
CR2032 (BAT501) Manufactured by SONY

1.6. AC CAUTION

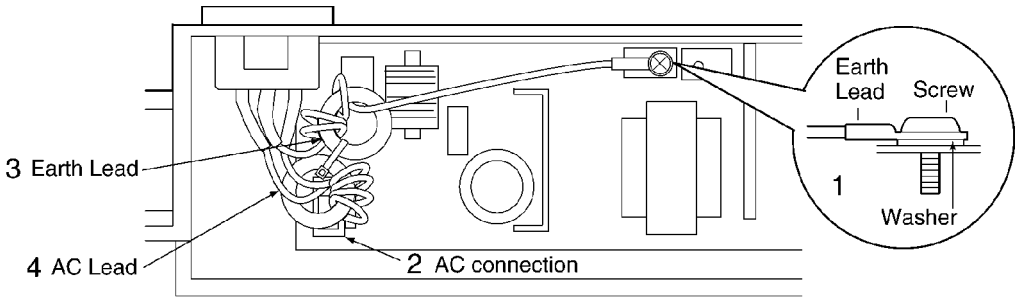
For safety, before closing the lower cabinet, please make sure of the following precautions.

1. The earth lead is fixed with the screw.

2. The AC connector is connected properly.

3. Wrap the earth lead around the core 3 times.

4. Wrap the AC lead around the core 3 times.

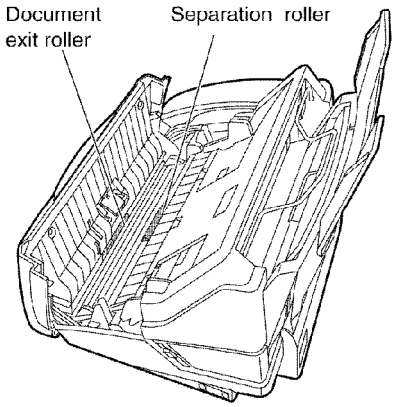


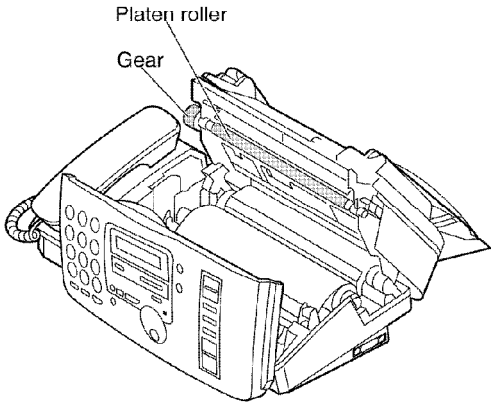
(Bottom View)

1.7. PERSONAL SAFETY PRECAUTIONS

1.7.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.
The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.



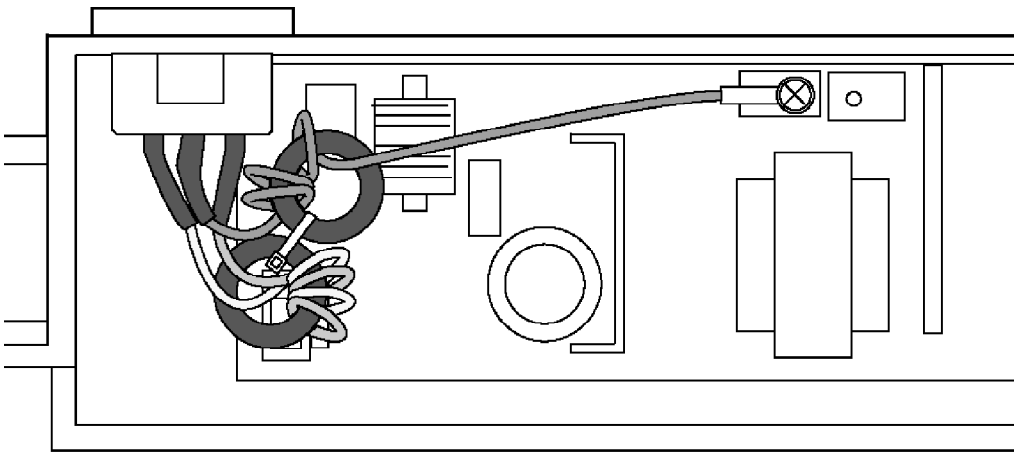


1.7.2. LIVE ELECTRICAL SECTIONS

All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

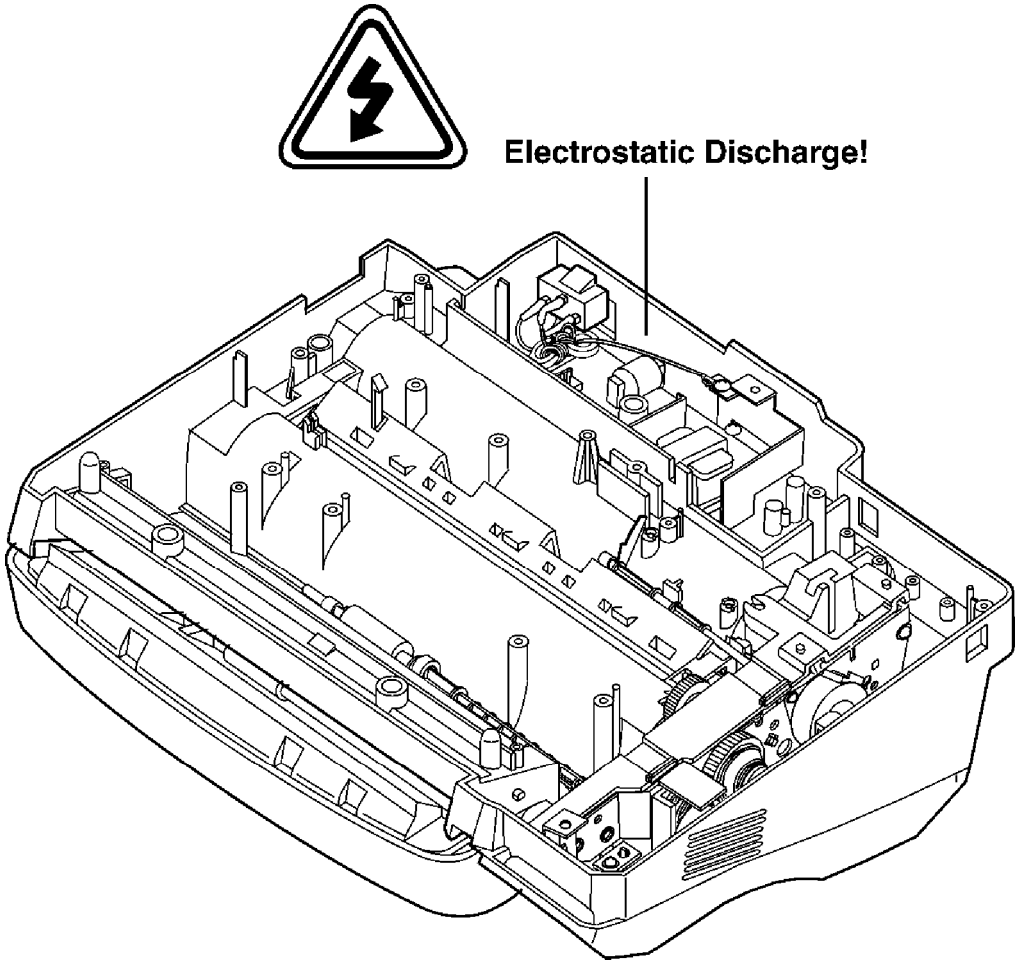


(Bottom View)

1.8. SERVICE PRECAUTIONS

1.8.1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



1.9. FEATURES

General

- Help function

Please refer to WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.() to print below features.

1. SEND GUIDE (KX-FM189BL only)
2. QUICK SET UP
3. FEATURE LIST
4. EASY DIAL
5. TAD OPERATION
6. FAX RECEIVING
7. COPIER
8. REPORTS
9. CALLER ID

- LCD (Liquid Crystal Display) readout

Plain Paper Facsimile Machine

- 8 second transmission speed *

- A4, G3 compatible
- Automatic document feeder (10 sheets)
- Fax pager call
- Quick scan
- Resolution: Standard/Fine/Super fine/Half tone (64 level)
- Broad cast with Easy Dial
- 50-sheet paper capacity (20 lb.)
- Automatic fax/phone switching

*** The 8 second speed is based upon the ITU-T No. 1 Test Chart on the condition that memory transmission is performed.**

Large Memory (28 pages)... Performed by DRAM
Approx. 28 pages of memory reception
Approx. 25 pages of memory transmission

Integrated Telephone System

- On-hook dialing
- Digital Duplex Speakerphone
- Voice muting
- Redialing function
- 100-Station telephone directory with Easy Dial
- Caller ID compatible**
- **Feature requires a subscription to caller identification services offered by certain local telephone companies for a tee. You and your caller(s) must be in areas that provide caller identification services, and compatible equipment must be used by both telephone companies. Feature not available when the unit is connected to a PBX system.

Enhanced Copier Function

- Multi-copy function (up to 50 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone

Digital Answering System

- Voice Time/Day Stamp
- 18-Minutes recording time
- Voice and fax pager call

Printer function

- 200x400dpi printer capability

- Windows ® 95/98-ready printer driver

PC fax

- Send and Receive Faxes from your PC.

- 500-name address book

Scaner

- 200x400dpi scanning capability

- Easy to use document viewer

Note:
Windows is a registered trademark of Microsoft Corpporation in the United States and other countries.

1.10. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm in width

Max. 600 mm in length

Effective Scanning Width:

208 mm

Recording Paper Size:

A4: 210×297 mm

Effective Printing Width:

202 mm

Transmission Time*:

Approx. 8 s/page (Original mode)**

Scanning Density:

Horizontal:

8 pels/mm (203 pels/inch)
Vertical:
3.85 lines/mm (98 lines/inch)—STANDARD mode
7.7 lines/mm (196 lines/inch)—FINE/HALF TONE mode
15.4 lines/mm (392 lines/inch)—SUPER FINE Mode

Halftone Level:
64-level

Scanner Type:
Contact Image Sensor (CIS)

Printer Type:
Thermal Transfer on Plain Paper

Data Compression System:
Modified Huffman (MH), Modified READ (MR), Modified Modified READ (MMR)

Modem Speed:
14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback

Operating Environment:
5—35°C (41—95°F), 20—80 % RH (Relative Humidity)

Dimensions (H×W×D):
185×345×276 mm (7 9/32"×13 19/32"×10 7/8")

Mass (Weight):
Approx. 3.75 kg

Power Consumption:
Standby: Approx. 6 W
Transmission: Approx. 20 W
Reception: Approx. 40 W (When receiving a 20% black document)
Copy: Approx. 40 W (When copying a 20% black document)
Maximum: Approx. 120 W (When copying a 100% black document)

Power Supply:
220-240 V AC, 50 Hz

Memory Capacity:
Voice memory:
Approx. 18 minutes of recording time including greeting message**

*

Fax memory:
Approx. 28 pages memory reception
Approx. 25 pages memory transmission
(Based on ITU-T No. 1 Test Chart in standard resolution without using the Error Connection Mode.)

*** Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.**
****Transmission speed mentioned here is based upon the ITU-T No1 Test Chart and original mode. / If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.**
*****Recording time may be reduced by the calling party's background noise.**

Note:

- **Any details given in these instructions are subject to change without notice.**
- **The pictures and illustrations in these instructions may vary slightly from the actual product.**

Design and specifications are subject to change without notice.

1.11. OPTIONAL ACCESSORIES

Model No.	Description	Specifications
KX-FA55X	Replacement Film	2 rolls-216 mm X 50 m (8 1/2" X 164')

1.12. TEST CHART

1.12.1. ITU-T No.1 TEST CHART

THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

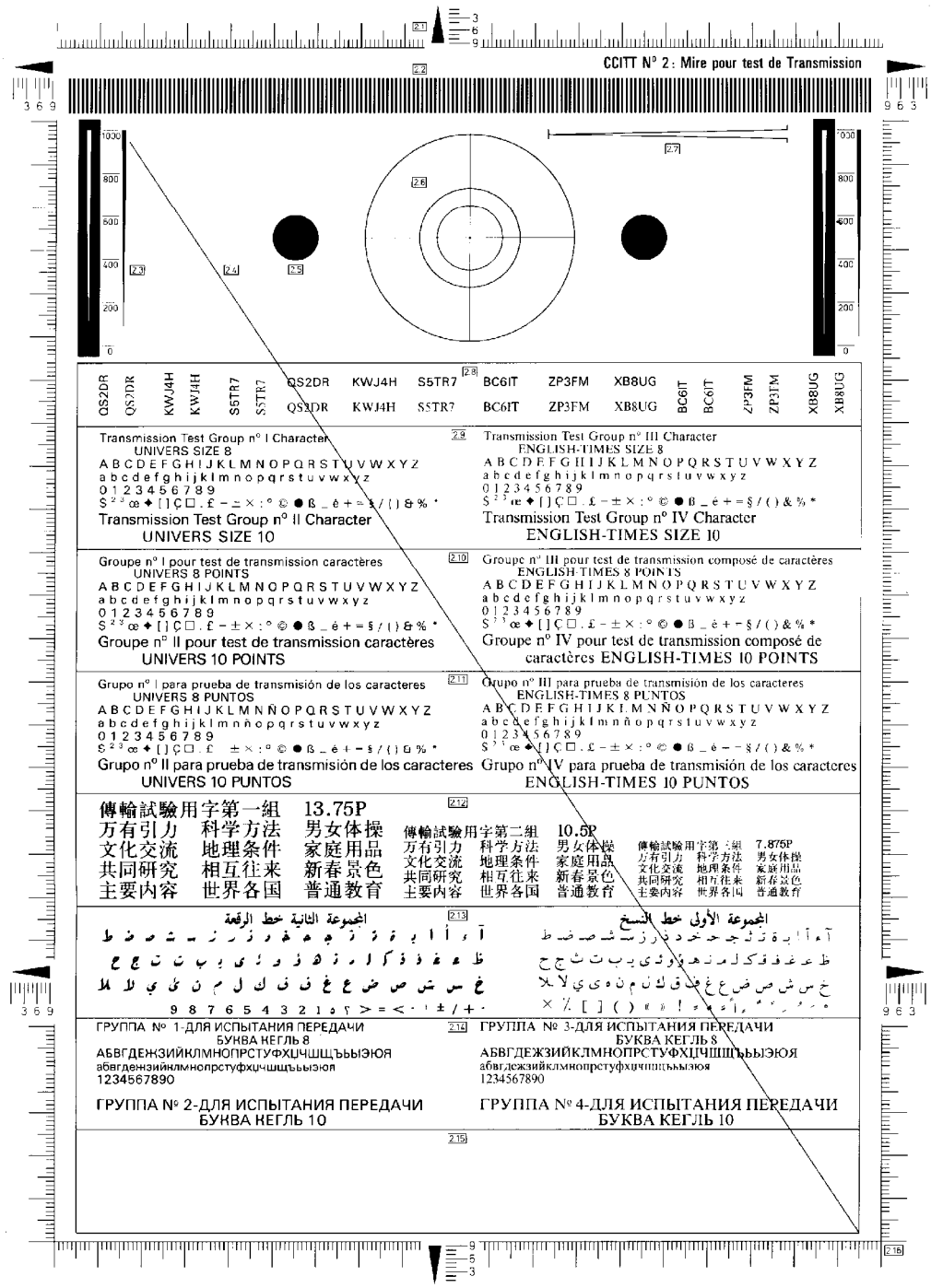
Yours sincerely,

Phil.

P.J. CROSS
Group Leader - Facsimile Research

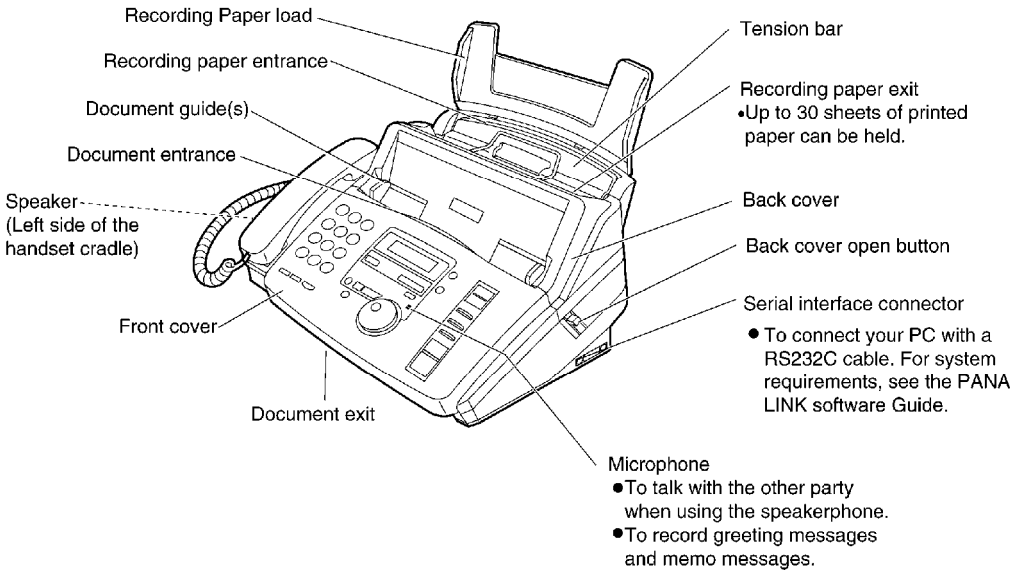
Registered in England: No. 2038
Registered Office: 60 Vicara Lane, Ilford. Essex.

1.12.2. ITU-T No.2 TEST CHART


CCITT N° 2 : Mire pour test de Transmission
QS2DR KWJ4H S5TR7 BC6IT ZP3FM XB8UG
Transmission Test Group n° I Character
UNIVERS SIZE 8
Transmission Test Group n° II Character
UNIVERS SIZE 10
Transmission Test Group n° III Character
ENGLISH-TIMES SIZE 8
Transmission Test Group n° IV Character
ENGLISH-TIMES SIZE 10
Groupe n° I pour test de transmission caractères
UNIVERS 8 POINTS
Groupe n° II pour test de transmission caractères
UNIVERS 10 POINTS
Groupe n° III pour test de transmission composé de caractères
ENGLISH-TIMES 8 POINTS
Groupe n° IV pour test de transmission composé de caractères ENGLISH-TIMES 10 POINTS
Grupo n° I para prueba de transmisión de los caracteres
UNIVERS 8 PUNTOS
Grupo n° II para prueba de transmisión de los caracteres
UNIVERS 10 PUNTOS
Grupo n° III para prueba de transmisión de los caracteres
ENGLISH-TIMES 8 PUNTOS
Grupo n° IV para prueba de transmisión de los caracteres
ENGLISH-TIMES 10 PUNTOS
傳輸試驗用字第一組 13.75P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育
傳輸試驗用字第二組 10.5P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育
傳輸試驗用字第 組 7.875P
万有引力 科学方法 男女体操
文化交流 地理条件 家庭用品
共同研究 相互往来 新春景色
主要内容 世界各国 普通教育
المجموعة الثانية خط الرقعة
المجموعة الأولى خط النسخ
ГРУППА № 1-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 8
ГРУППА № 2-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 10
ГРУППА № 3-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 8
ГРУППА № 4-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ
БУКВА КЕГЛЬ 10

1.13. LOCATION OF CONTROLS

1.13.1. OVERVIEW

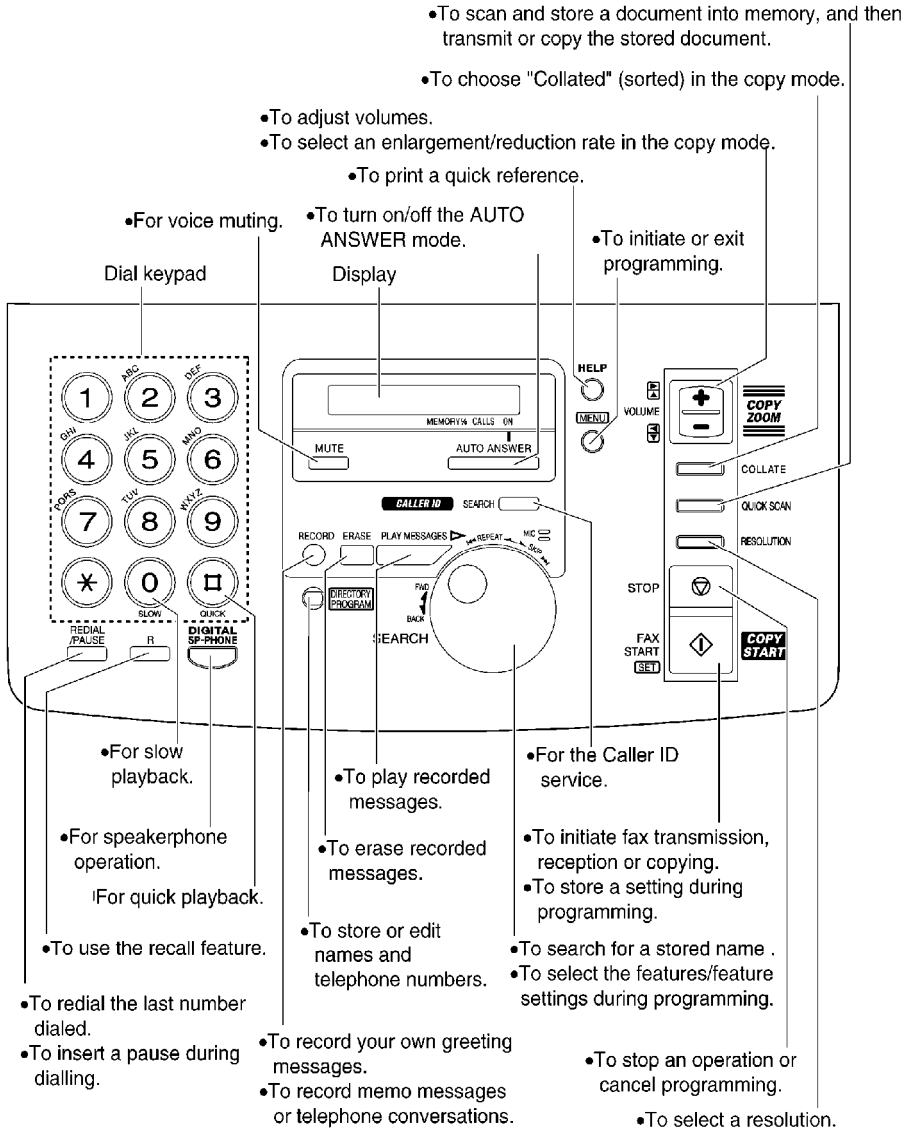

Recording Paper load
Recording paper entrance
Document guide(s)
Document entrance
Speaker
(Left side of the handset cradle)
Front cover
Document exit
Tension bar
Recording paper exit
•Up to 30 sheets of printed paper can be held.
Back cover
Back cover open button
Serial interface connector
● To connect your PC with a RS232C cable. For system requirements, see the PANA LINK software Guide.
Microphone
●To talk with the other party when using the speakerphone.
●To record greeting messages and memo messages.

Note:

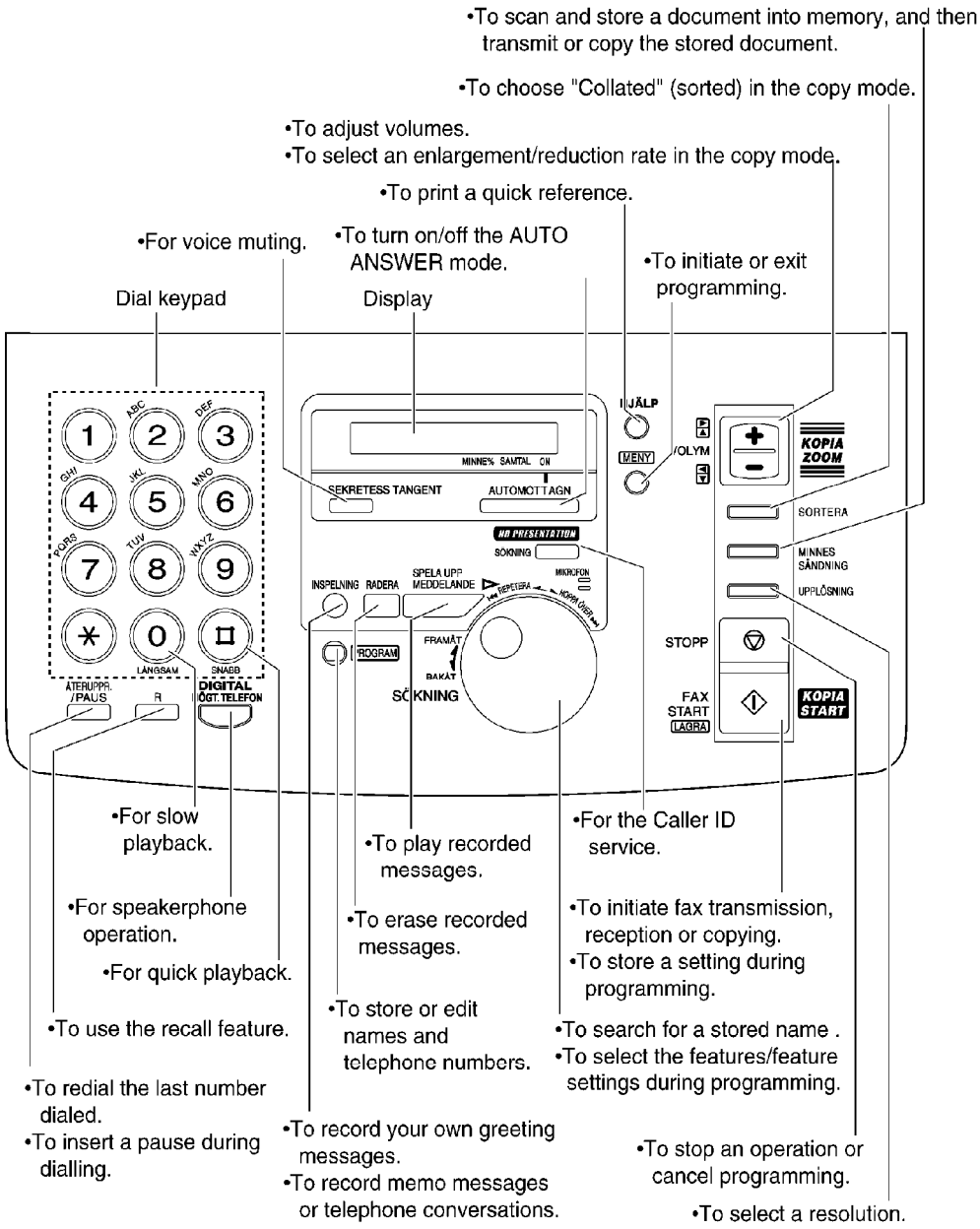
- The document will be ejected from the front of the unit. Install the unit on a desk or floor with a smooth surface and do not place anything in front of the unit.

1.13.2. CONTROL PANEL

1.13.2.1. KX-FM189BL



1.13.2.2. KX-FM189S

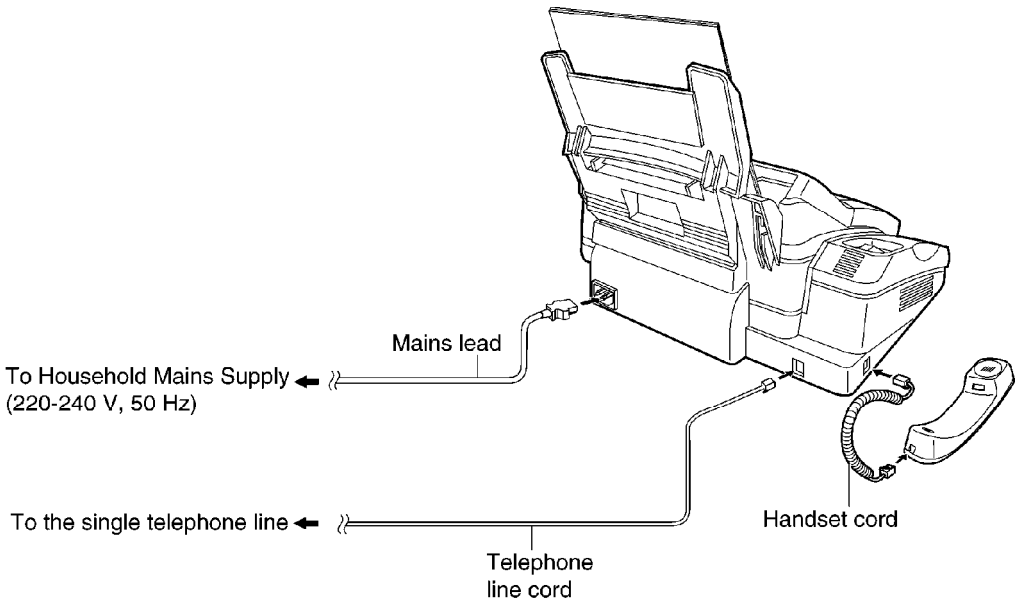


1.14. CONNECTIONS

1.14.1. CONNECTIONS

(1) Connect the handset cord.
(2) Connect the telephone line cord.
(3) Connect the power cord.

- When the power is turned on for the first time, the unit will print some basic information.

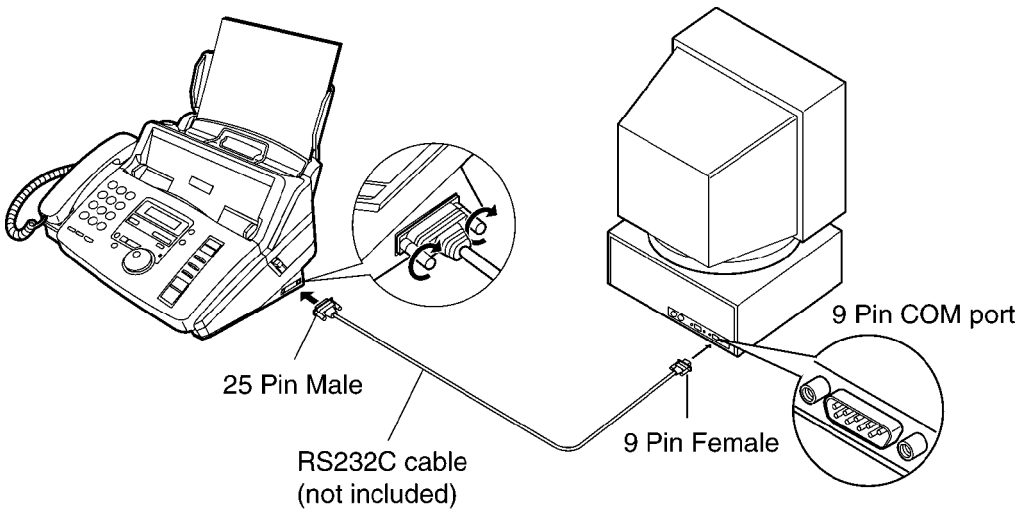


Note:

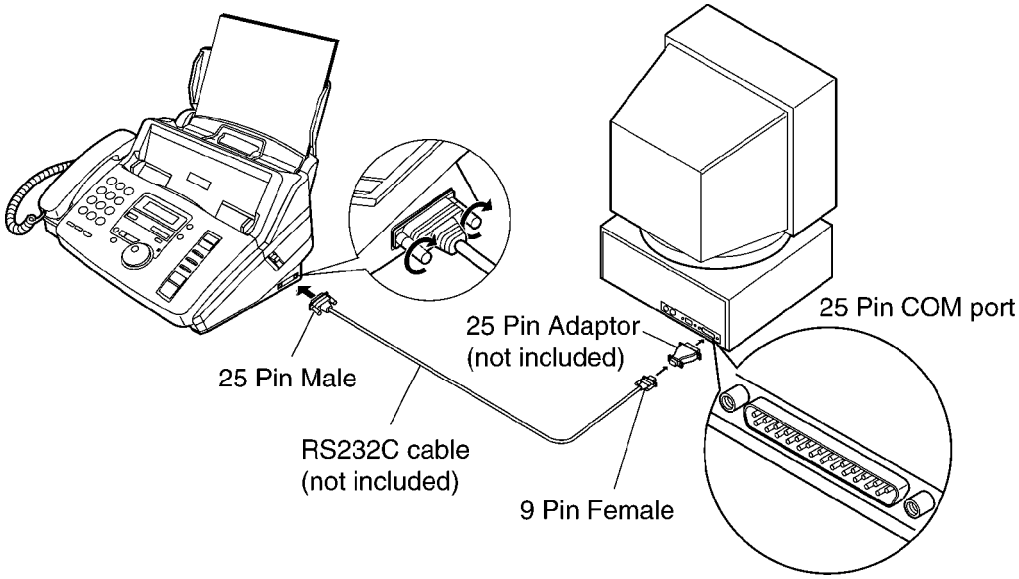
- When you operate this product, the power outlet should be near the product and easily accessible.

1.14.2. CONNECTING TO A COMPUTER

1.14.2.1. IF YOUR PC HAS A 9 PIN COM PORT:



1.14.2.2. IF YOUR PC HAS A 25 PIN COM PORT:

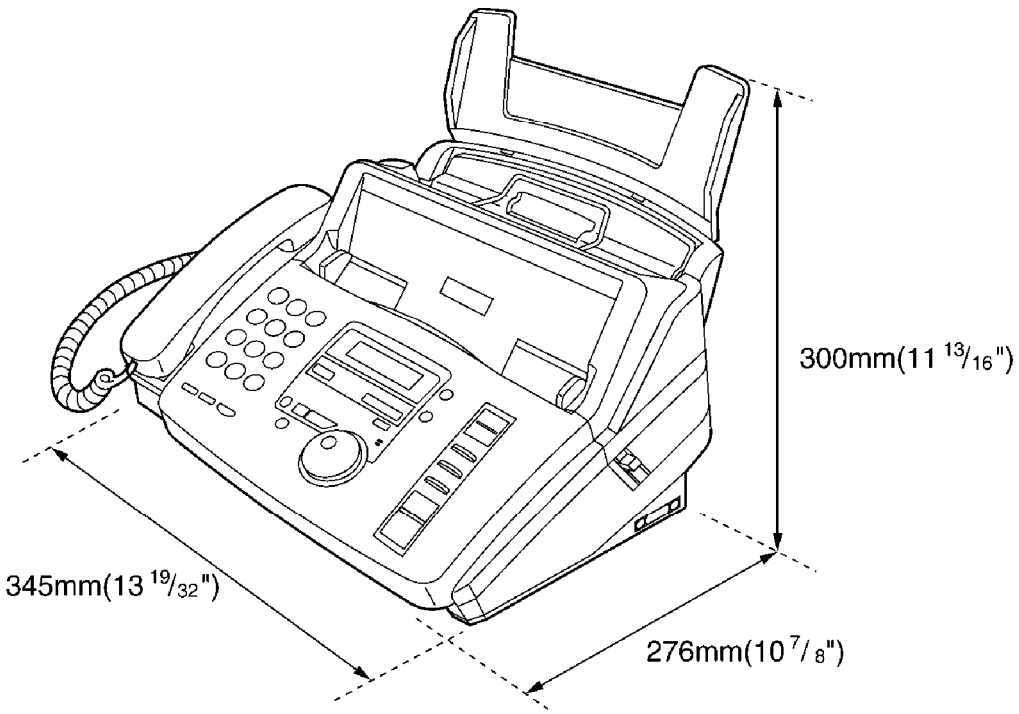


Note:
A RS232C cable less than 3 meters long (DB9 Female/DB25 Male) is required to connect to a personal computer. Please purchase at any computer supply store.

1.15. INSTALLATION

1.15.1. INSTALLATION SPACE

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently.



Note:

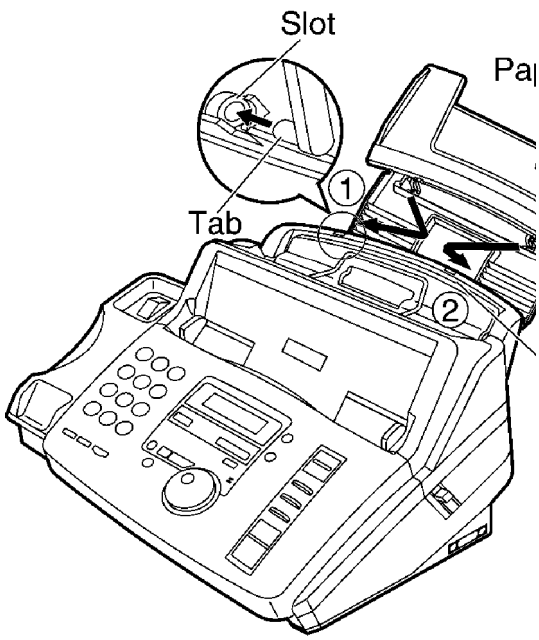
- Avoid excessive heat or humidity.
- Use the unit within the following ranges of temperature and humidity.
- Ambient temperature: 5°C to 35°C
- Relative humidity: 20% to 80% (without condensation)
- Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.
- Avoid direct sunlight.
- Do not install near devices which contain magnets or generate magnetic fields.
- Do not subject the unit to strong physical shock or vibration.
- Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.
- To protect the unit from damage, hold both sides when you move it.

1.15.2. INSTALLING THE PAPER LOAD

Insert one tab on the paper load into one slot on the back of the unit (①) and then insert the other tab into the other slot (②).

Note:

- Do not place the unit in areas where the paper tray may be obstructed by a wall, etc.



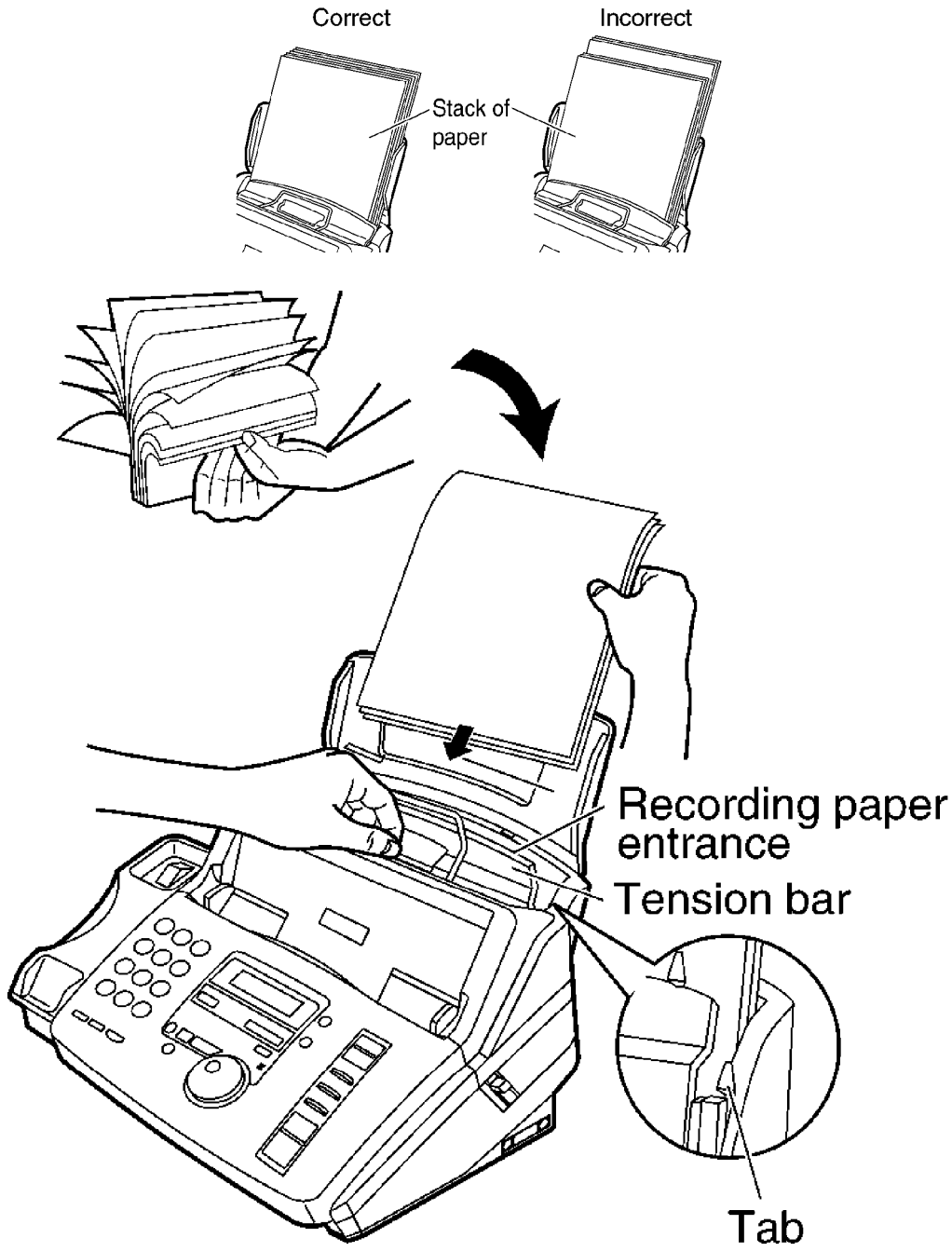
1.15.3. INSTALLING THE RECORDING PAPER

A4 size recording paper (210 mm × 297 mm) can be loaded. The unit can hold up to 50 sheets of 60 g/m2 to 75 g/m2 paper or 30 sheets of 90 g/m2 paper.

1. Fan the stack of paper to prevent a paper jam.

2. Pull the tension bar forward and hold open while inserting the paper.

- The paper should not be over the tab.
- If the paper is not inserted correctly, readjust the paper or the paper may jam.



Note for recording paper:

- Avoid paper with a cotton and/or fiber content that is over 20%,

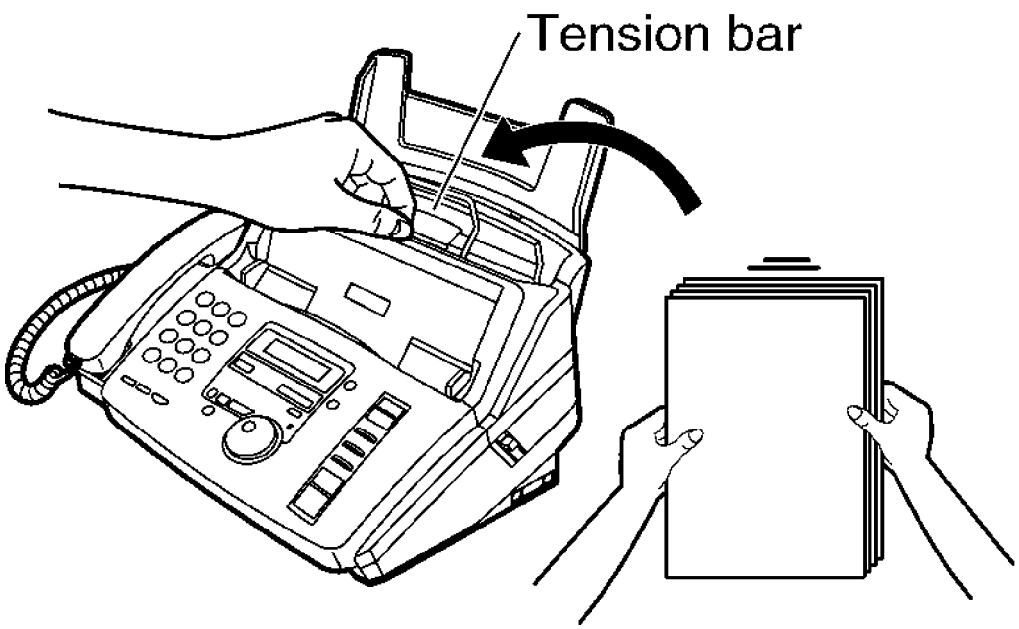
such as letterhead paper or paper used for resumes.
- Do not use different types or thicknesses of paper at the same time. This may cause a paper jam.
- Avoid extremely smooth or shiny paper that is highly textured.
- Avoid paper that is coated, damaged or wrinkled.

Note:

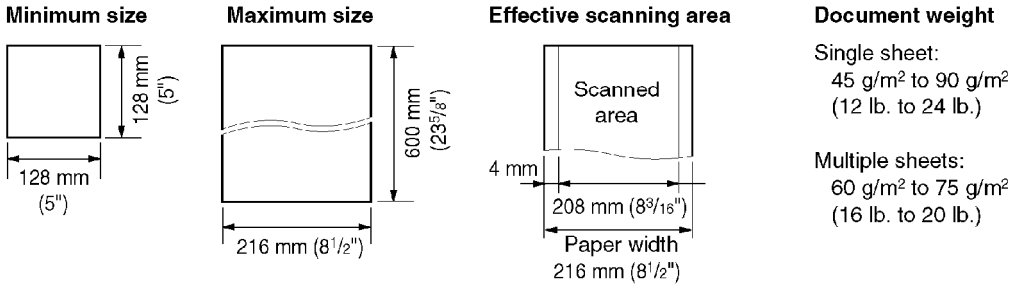
- Avoid double-sided printing
- Do not use paper printed from this unit for double-sided printing with other copiers or printers, or the paper may jam.
- Some paper only accepts print on one side. Try using the other side of paper if you are not happy with the print quality.

1.15.4. ADDING PAPER TO THE PAPER TRAY

1. Pull the cassette open lever forward and remove all of the installed paper.
2. Add paper to the removed paper and straighten.
3. Fan the stack of paper.
4. Pull the tension bar forward and hold open while inserting the paper.



1.15.5. DOCUMENTS THE UNIT CAN FEED



Note:

- Remove chips, staples or other similar fastening objects.

- Check that ink, paste or correction fluid has dried.

- Do not send the following types of documents. Use copies for fax transmission.

— Chemically treated paper such as carbon or carbon less duplicating paper

— Electrostatically charged paper

— Heavily curled, creased or torn paper

— Paper with a coated surface

— Paper with a faint image

— Paper with printing on the opposite side that can be seen through the front (e.q. newspaper)

1.15.6. SETTING YOUR LOGO

The logo can be your company, division or name.

Refer to LCD MESSAGES (for KX-FM189S)() and BUTTON NAME (for KX-FM189S)().

1. Press [MENU].

Display:

```
1.SYSTEM SET UP
```

2. Press [#], then [0] [2].

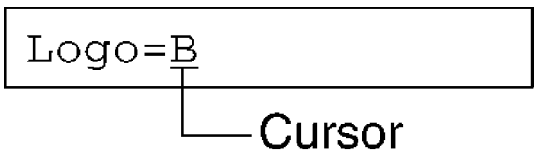
```
YOUR LOGO
```

3. Press [SET].

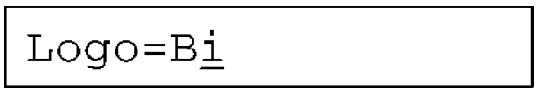
```
Logo=
```

4. Enter your logo, up to 30 characters, by using the dial keypad.
Example: Bill

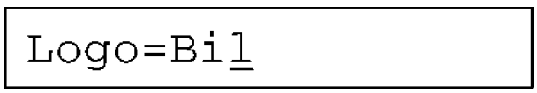
A. Press [2] twice.



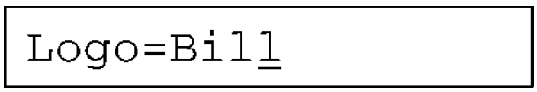
B. Press [4] six times.



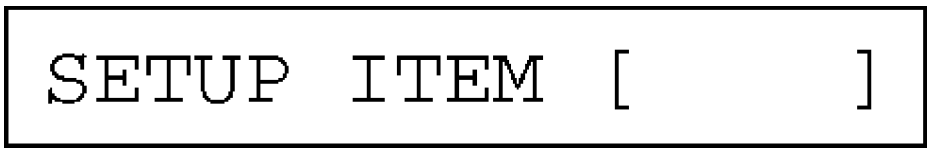
C. Press [5] six times.



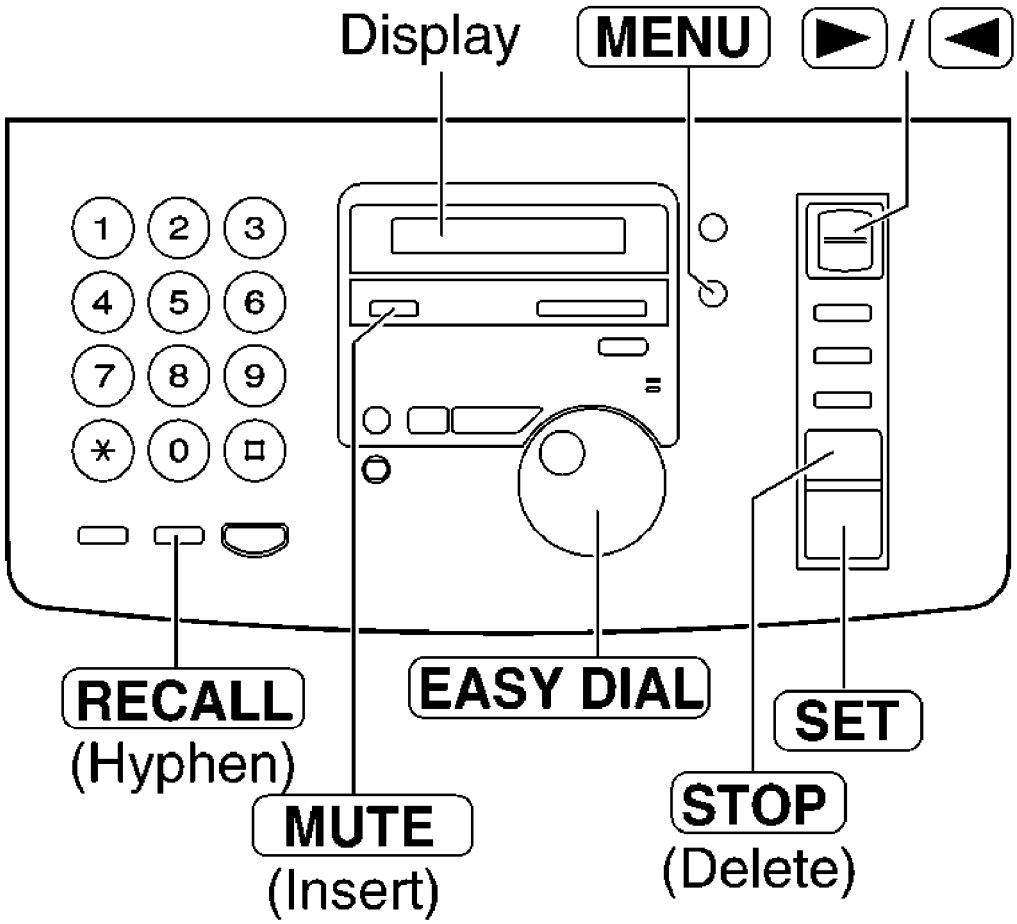
D. Press [►] to move the cursor to the next space and press [5] six times.



5. Press [SET].



6. Press [MENU].



Note:

- You can enter your logo by rotating EASY DIAL.

To correct a mistake

-Press ▶ or ◀ to move the cursor to the incorrect character, then make the correction.

To delete a character

-Move the cursor to the character you want to delete and press STOP.

To insert a character

1. Press ▶ or ◀ to move the cursor to the position where you want to insert the character.
2. Press MUTE (Insert) to insert a space and ente

1.15.7. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Refer to BUTTON NAME (for KX-FM189S)().

(for KX-FM189BL)

Keys	Characters
1	1 [ ] { } + - / = , . _ ` : ; ? |
2	A B C a b c 2
3	D E F d e f 3
4	G H I g h i 4
5	J K L j k l 5
6	M N O m n o 6
7	P Q R S p q r s 7
8	T U V t u v 8
9	W X Y Z w x y z 9
0	0 ( ) < > ! " # $ % & ¥ * @ ^ ' →
R	**Hyphen** button (To insert a hyphen.)
MUTE	**Insert** button (To insert one character or one space.)
STOP	**Delete** button (To delete a character.)
▶	▶ key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
◀	◀ key (To move the cursor to the left.)

(for KX-FM189S)

Keys	Characters
1	1 [ ] { } + - / = , . _ ` : ; ? |
2	A B C a b c 2
3	D E F d e f 3
4	G H I g h i 4
5	J K L j k l 5
6	M N O m n o 6
7	P Q R S p q r s 7
8	T U V t u v 8
9	W X Y Z w x y z 9
0	Å Ä Ö å ä ö 0 ( ) < > ! " # $ % & ¥ * @ ^ ' →
R	**Hyphen** button (To insert a hyphen.)
MUTE	**Insert** button (To insert one character or one space.)
STOP	**Delete** button (To delete a character.)
▶	▶ -tasten (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
◀	◀ -tangent (To move the cursor to the left.)

1.15.8. TO SELECT CHARACTERS USING THE EASY DIAL

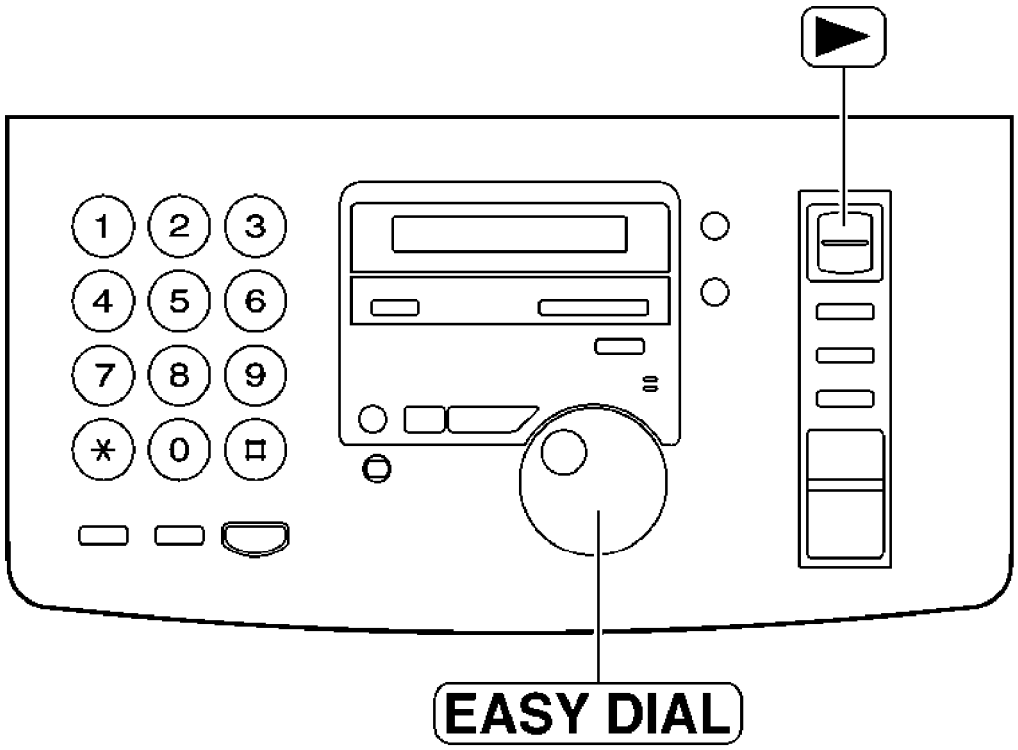
Instead of pressing the dial keys, you can select characters using the EASY DIAL.

Refer to BUTTON NAME (for KX-FM189S)().

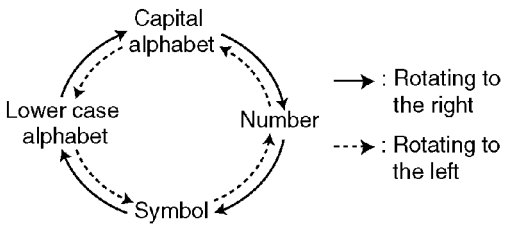
1. Rotate EASY DIAL until the desired character is displayed.
2. Press ► to move the cursor to the next space.

   - The character displayed in step 1 is inserted.

3. Return to step 1 to enter the next character.



Display order of characters



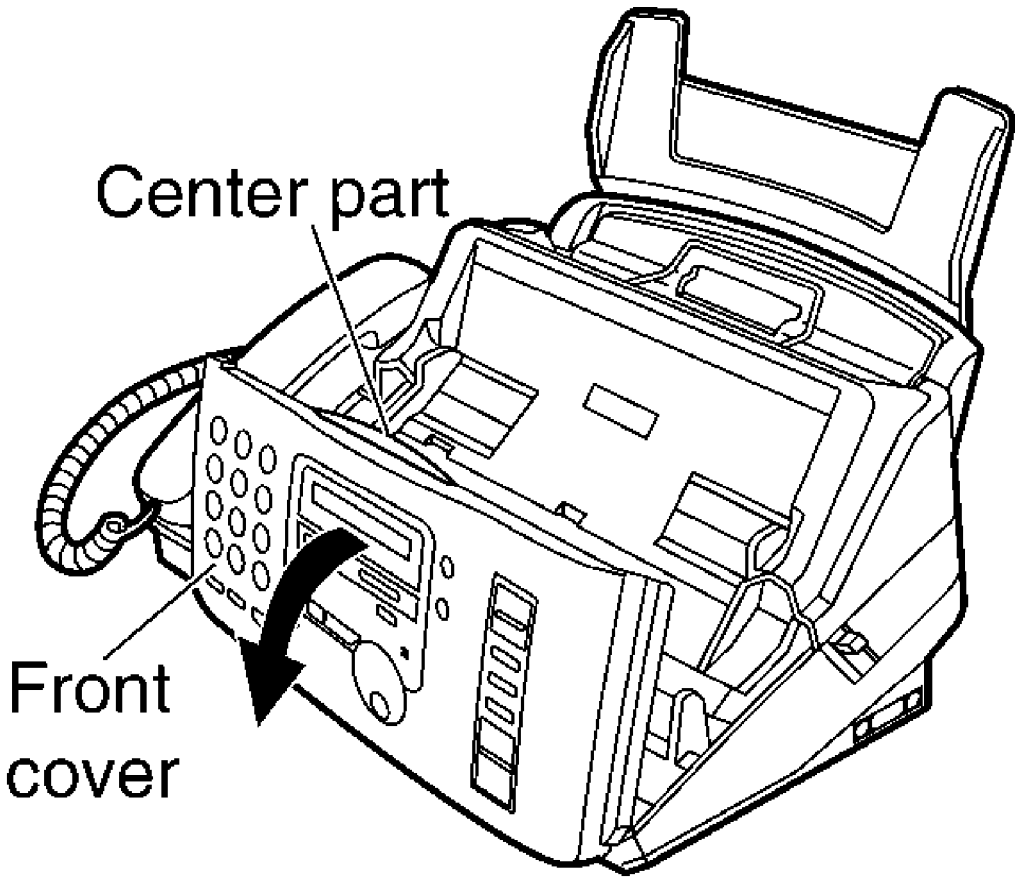
1.15.9. REPLACING THE FILM CARTRIDGE

When the unit runs out of ink film, the following message will be displayed.
Display: Refer to LCD MESSAGES (for KX-FM189S)().

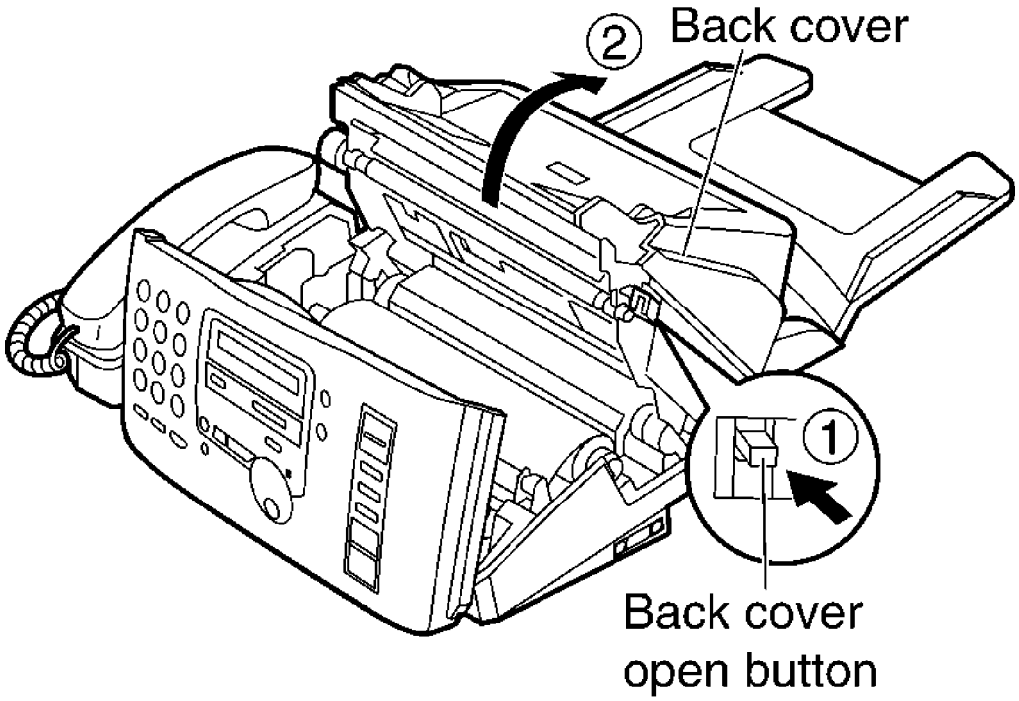
CHECK FILM

Install a new ink film. The following ink films are available for replacement. Each roll prints about 140 A4 size pages.
Refer to OPTIONAL ACCESSORIES.()
Model No. KX-FA55X: Replacement film (2 rolls)

1. Open the front cover by pulling up the center part.

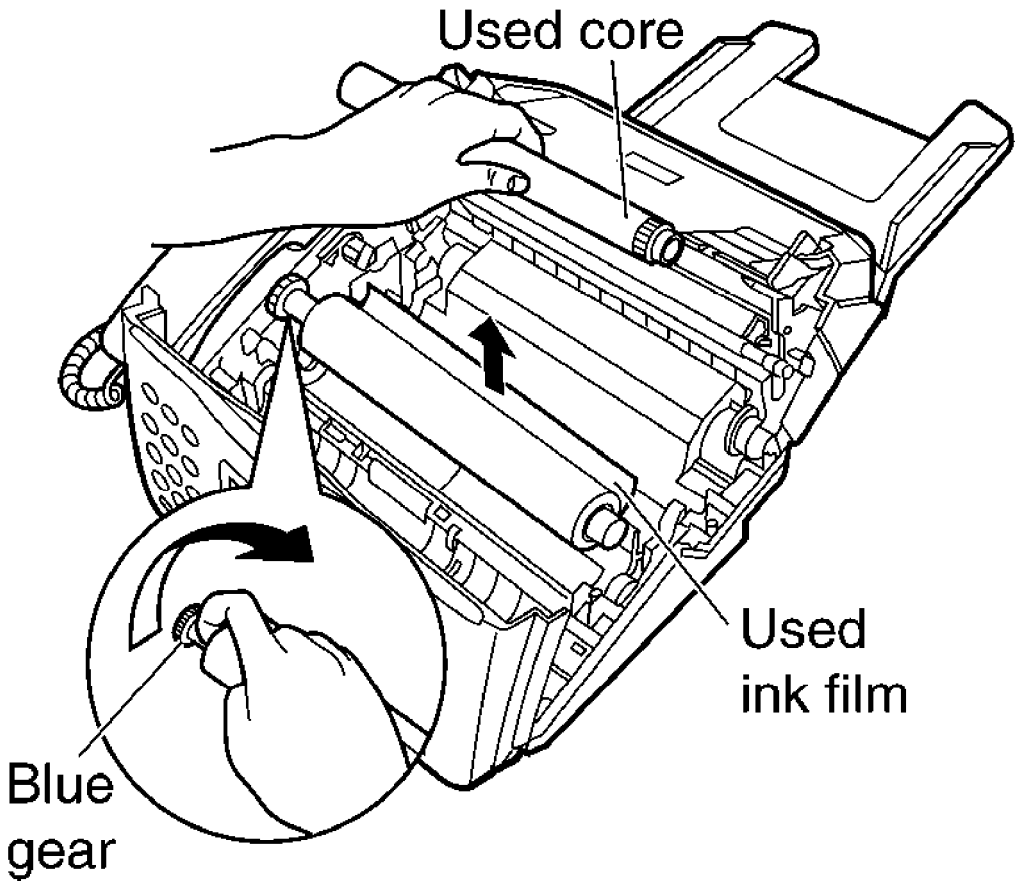


2. Push the back cover open button (①) and open the back cover (②).

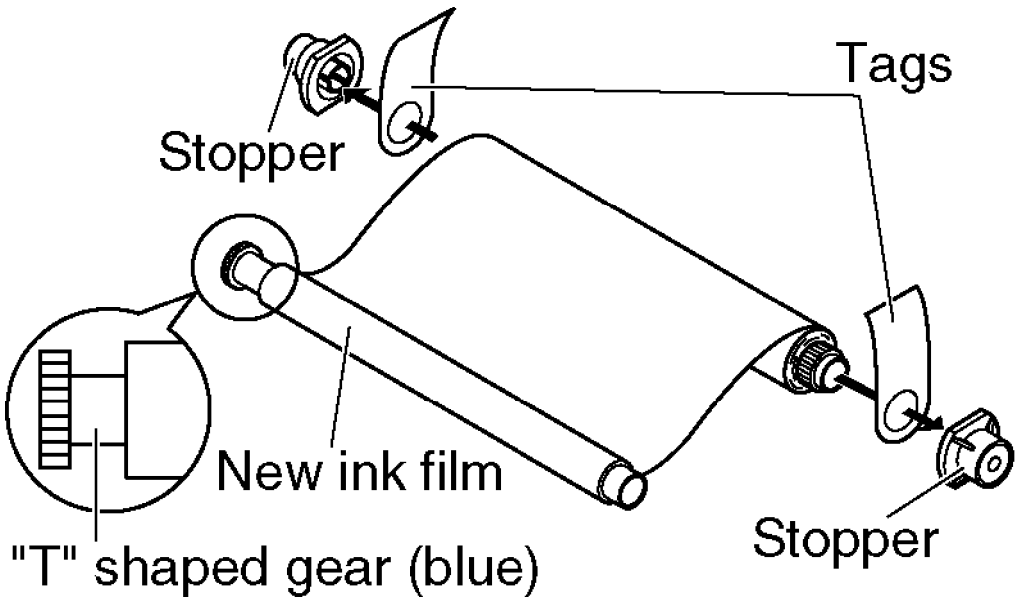


3. Pull up the blue gear side and remove the used ink film. Remove

the used core.

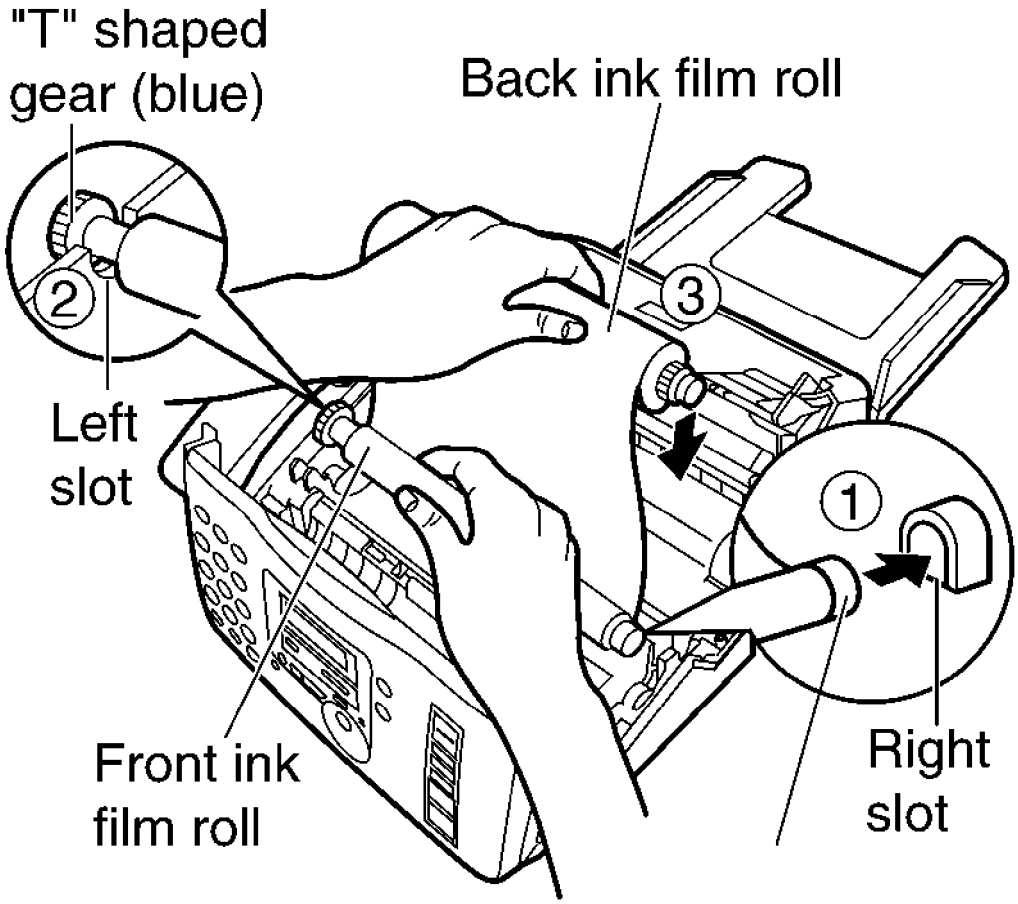


4. Remove the stoppers and tags from the new ink film. Find the “T” shaped gear (blue).

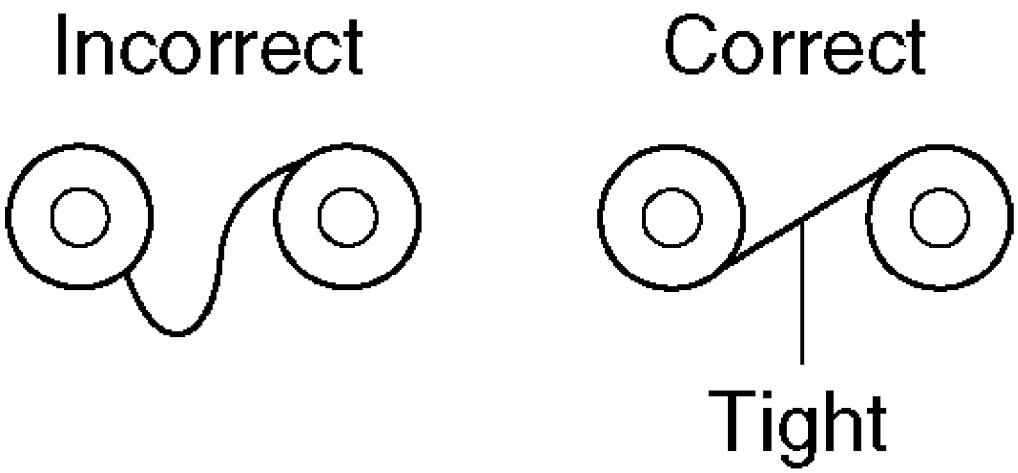


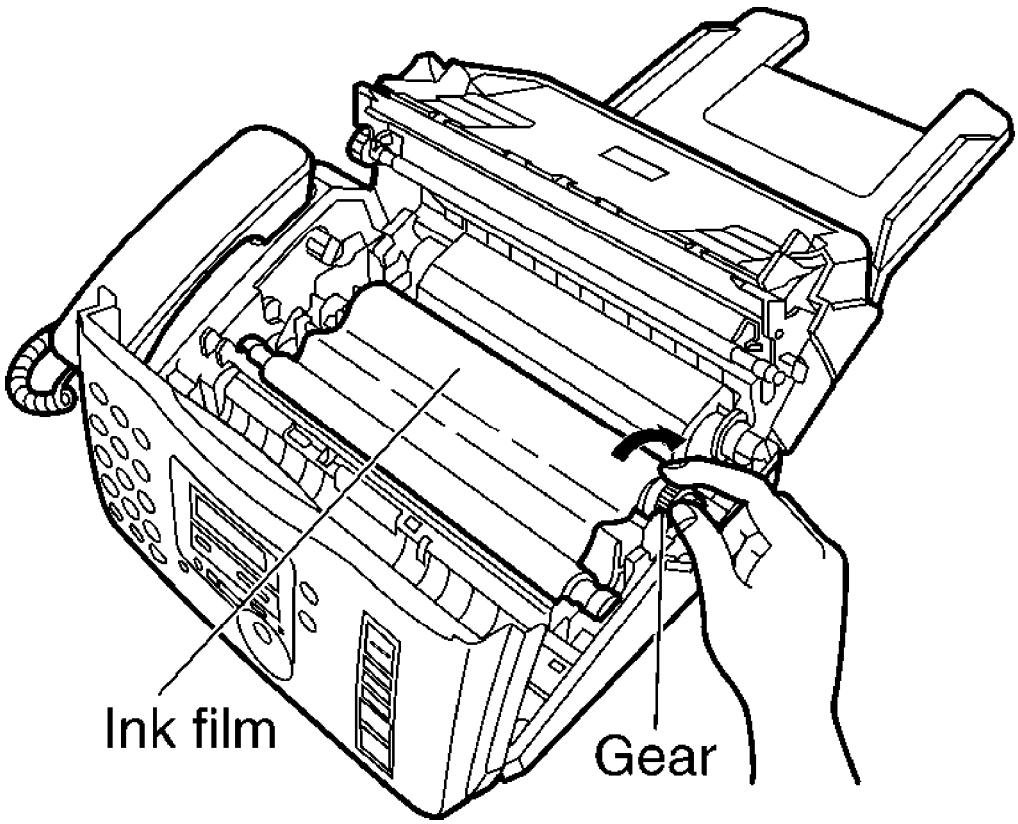
5. Insert the blue core of the front ink film roll into the right slot of

the unit (①). Insert the “T” shaped gear (blue) into the left slot of the unit (②). / Insert the back ink film roll (③).



6. If the ink film is slack, tighten it by winding the gear.





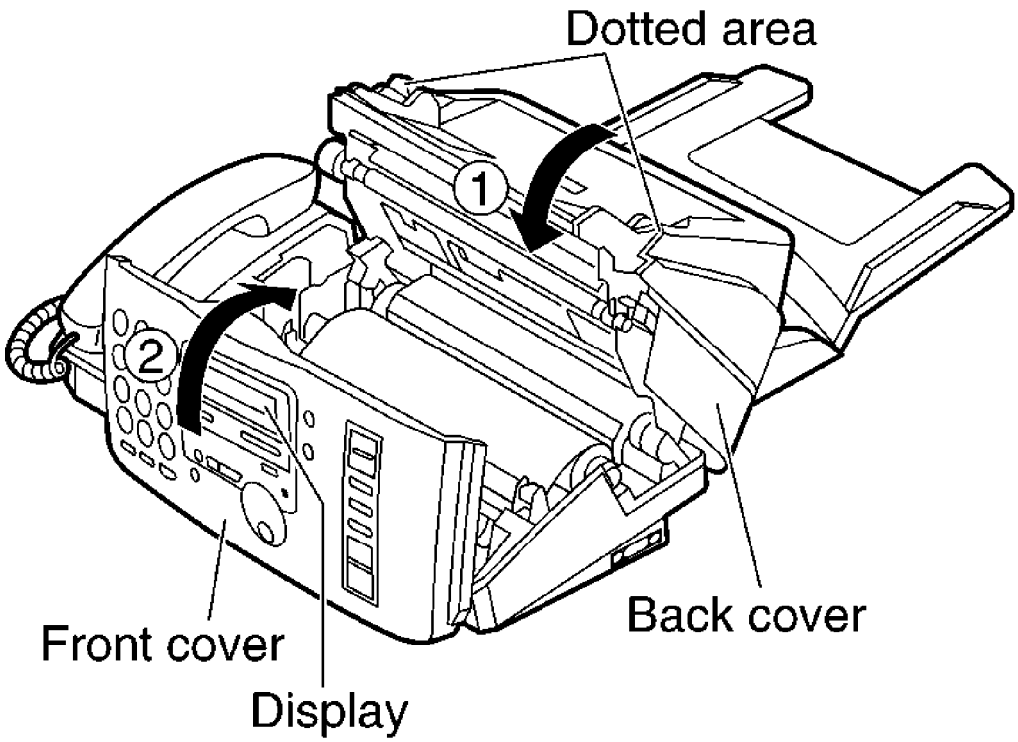
7. Close the back cover securely by pushing down on the dotted area at both ends (①). / Close the front cover securely (②).

- The following message will be displayed while the unit is checking that there is no slack on the ink film.
Display: Refer to LCD MESSAGES (for KX-FM189S)().

PLEASE WAIT

Note:

- The ink film is completely safe to touch, and will not rub off on your hands like carbon paper.



1.16. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.16.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

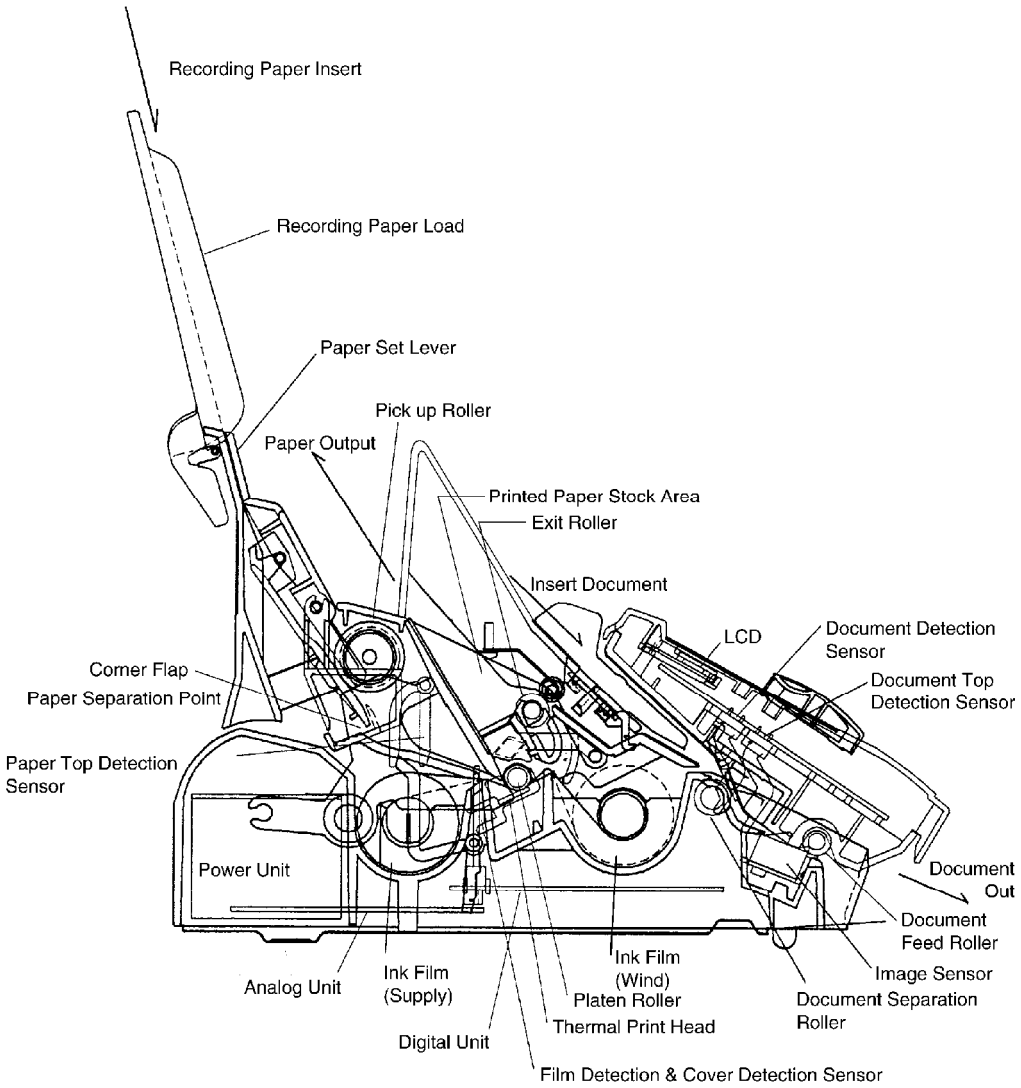
1. **Periodic maintenance**
   Inspect the equipment periodically and if necessary, clean any contaminated parts.
2. **Check for breakdowns**
   Look for problems and consider how they arose.
   If the equipment can be still used, perform copying, self testing or communication testing.
3. **Check equipment**
   Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.
4. **Determine causes**
   Determine the causes of the equipment problem by troubleshooting.
5. **Equipment repairs**
   Repair or replace the defective parts and take appropriate

measures at this stage to ensure that the problem will not recur.

6. **Confirm normal operation of the equipment**
   After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. **Record keeping**
   Make a record of the measures taken to rectify the problem for future reference.

1.16.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



1.16.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to MAINTENA
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly. Remove the paper and film cartridge before cleaning.	—
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	Refer to MAINTENA
5	Sensors	Hook switch (SW101), Paper top sensor (PS501), Film end/Cover open switch (SW501), Document top switch (SW353), Document set switch (SW352). Confirm the operation of the sensors.	See MAINTENANCE ITEMS/COMPONEN LOCATIONS() and H REMOVE THE ANAI DIGITAL AND POWI BOARDS AND AC IN
6	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to MAINTENA
7	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

1.16.2.2. MAINTENANCE CYCLE

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedu
1	Separation Roller (Ref. No. 117)	3 months	7 years* (31,500 documents)	Refer to HOW T REMOVE THE SEPARATION R
2	Separation Rubber (Ref. No. 5)	3 months	7 years (31,500 documents)	Refer to MAINTE CHECK ITEMS/ COMPONENT LOCATIONS().
3	Feed Rollers (Ref. No. 4)	3 months	7 years (31,500 documents)	Refer to DISASS INSTRUCTIONS
4	Thermal Head (Ref. No. 33)	3 months	7 years (31,500 documents)	Refer to HOW T REMOVE THE T HEAD().
5	Platen Roller (Ref. No. 93)	3 months	7 years (31,500 documents)	Refer to HOW T REMOVE THE P ROLLER, BACK
6	Pickup Roller (Ref. No. 72)	3 months	7 years (31,500 documents)	Refer to HOW T REMOVE THE P ROLLER().

1.16.3. MAINTENANCE

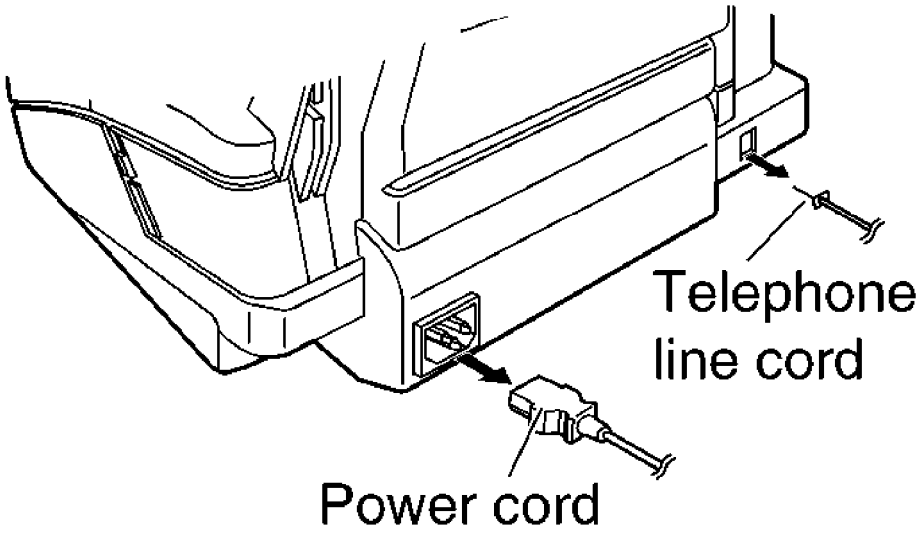
1.16.3.1. CLEANING THE DOCUMENT FEEDER UNIT

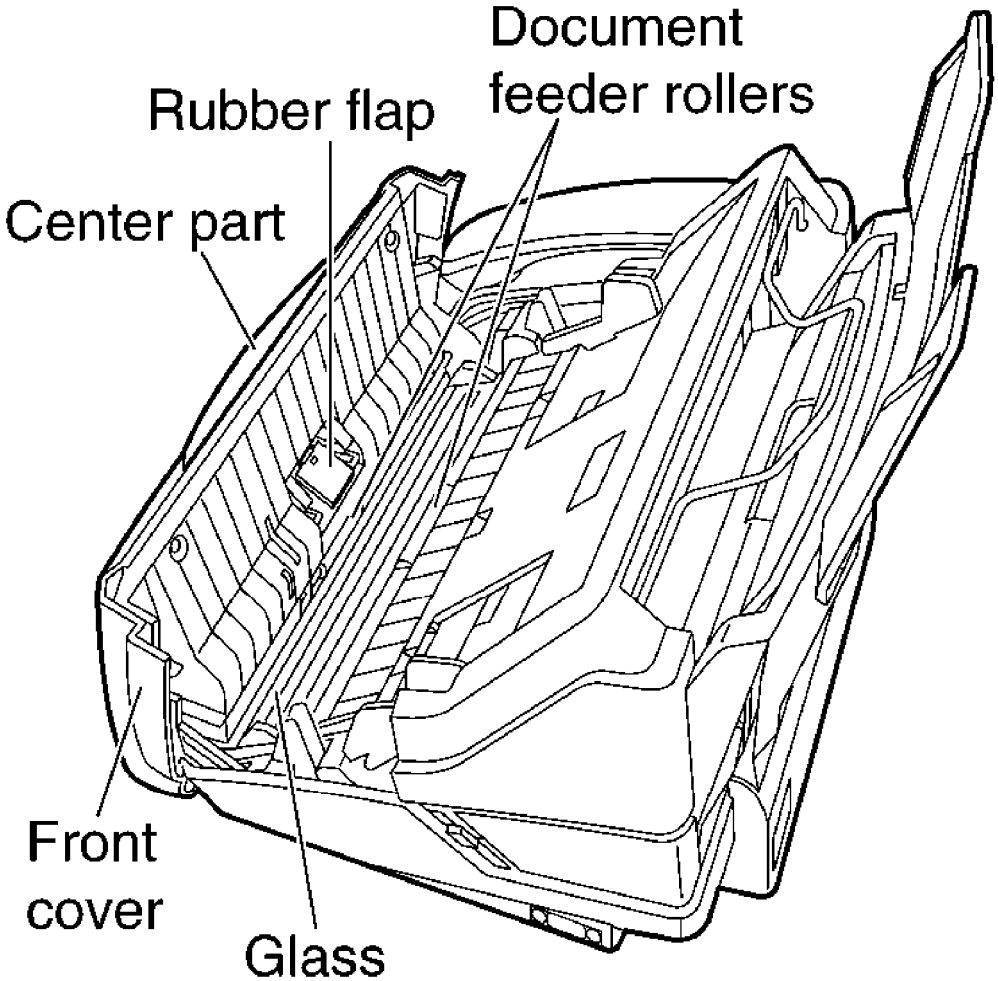
If misfeeding occurs frequently or if dirty patterns or bands appear on a transmitted document or on the original of a copied document, clean the document feeder.

1. **Disconnect the power cord and the telephone line cord.**
2. **Open the front cover by pulling up the center part.**
3. **Clean the document feed rollers and rubber flap with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.**
4. **Clean the glass with a soft dry cloth.**
5. **Close the front cover securely.**
6. **Connect the power cord and the telephone line cord.**

Caution:

- Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.





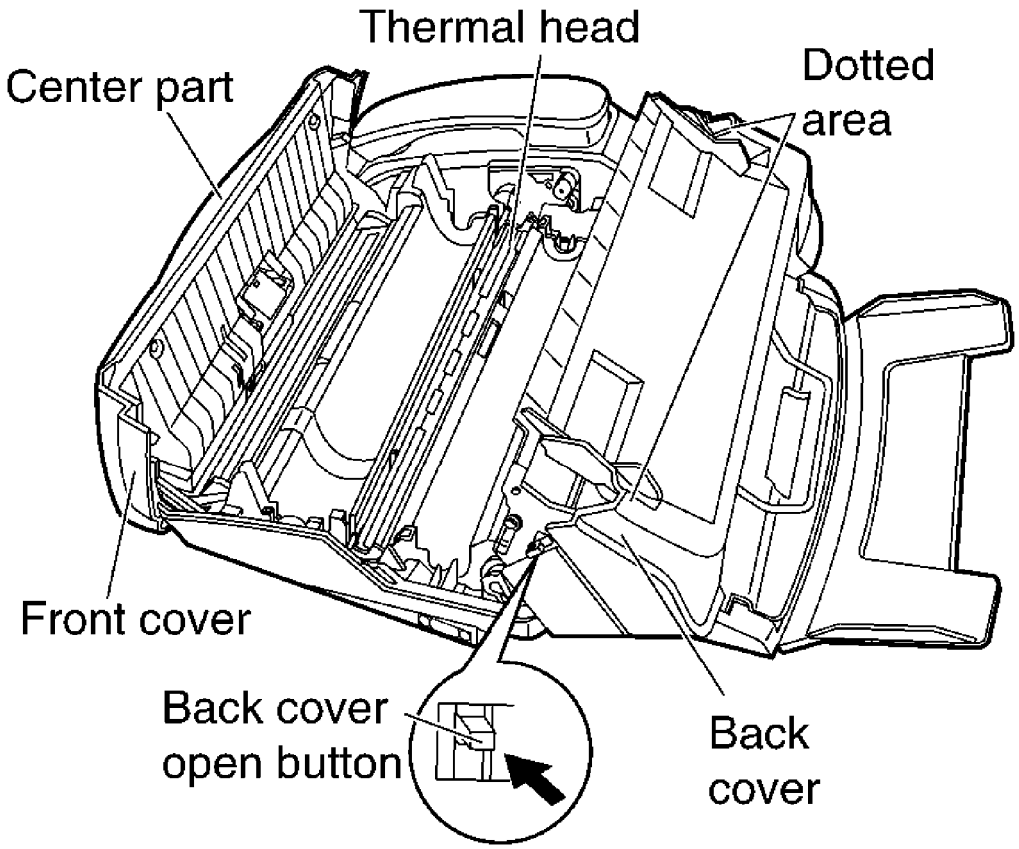
1.16.3.2. CLEANING THE THERMAL HEAD AND BLACK BAR

If dirty patterns or black or white bands appear on a copied or received document, clean the thermal head.

1. Disconnect the power cord and the telephone line cord.
2. Open the front cover by pulling up the center part.
3. Open the back cover by pushing the back cover open button.
4. Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.
5. Close the back cover securely by pushing down on the dotted area at both ends. Close the front cover securely.
6. Connect the power cord and the telephone line cord.

Caution:

- To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly with your fingers.



1.16.3.3. CLEANING THE PICKUP ROLLER

Refer to HOW TO REMOVE THE PICKUP ROLLER.()

2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. **If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.**
2. **Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).**
   If the problem occurs randomly, check it very carefully.
3. **When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.**
4. **After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.**
5. **Always test to verify that the unit is working normally.**

2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use:

1. **press** HELP.
2. **press** EASY DIAL **until the desired item is displayed.**
3. **press** SET.

Note:

Refer to BUTTON NAME (for KX-FM189S)().

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE	• There is something wrong with the unit. Contact our service personnel. [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead. (for technicians)]
CALL SERVICE2	• This message appears when the gear is not in an idle state. Check the GEAR BLOCK.
COVER OPEN ↕ CHECK FILM	• The covers are open. Close them. • The ink film is empty. Replace the ink film with a new one. • The ink film is not installed. Install it. • The ink film is slack. Tighten it.
CHECK DOCUMENT	• The document is not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, clean the document feeder rollers and try again. If the problem remains, adjust the feeder pressure. (Refer to **3 ADJUSTMENT** and **2.2.1. DOCUMENT JAM**)
CHECK MEMORY	• Memory (telephone numbers, parameters, etc.) has been erased. Re-program. [The backup battery on the top of the digital board may be low or dead, so check it.]
CHECK PAPER	• The recording paper is not installed or the unit has run out of paper. Install paper and press SET to clear the message. • The recording paper is not fed into the unit properly. Reinstall paper and press SET to clear. • The recording paper has jammed near the recording paper entrance. Clear the jammed paper and press SET to clear the message. Do not install folded or heavily curled paper.
FAX IN MEMORY	• The unit has a document in memory. See the other displayed message instructions to print out the document.
FAX MEMORY FULL	• Memory is full of received documents due to lack of recording paper or a recording paper jam, etc. Install paper or clear the jammed paper. • When performing memory transmission, the document being stored exceeds the memory capacity of the unit. Transmit the entire document manually.
EASY DIAL FULL	• There is no space to store new stations in the EASY DIAL durectory. Erase unnecessary stations.
MEMORY FULL	• When making a copy, the document being stored exceeds the memory capacity of the unit. Press STOP to clear the message. Divide the document and try again.
MESSAGE FULL	• There is no memory left to record a voice message. Erase unnecessary messages.
MODEM ERROR	• There is something wrong with the modem circuit.
NO FAX REPLY	• The other party's fax machine is busy or has run out of recording paper. Try again.
NO TAD GREETING (KX-FM189S only)	• Your TAD/FAX greeting message is not recorded. Record a message. • The voice guidance feature is set to "OFF". Modify the setting. Pre-recorded greeting message will be adopted.

Note:

The explanations given in the [ ] are for servicemen only.

Refer to LCD MESSAGES (for KX-FM189S)().

CROSS REFERENCE:

DOCUMENT JAMS()

ADJUSTMENTS()

DISPLAY MESSAGE	CAUSE AND REMEDY
NO TRANS-GREET. (KX-FM189S only)	• Your message transfer greeting message is not recorded. Record a message. • The voice guidance feature is set to "OFF". Modify the setting. Pre-recorded greeting message will be adopted.
PAPER JAMMED	• A recording paper jam occurred. Clear the jammed paper. [If the printout jams, please refer to **2.2.2. RECORDING PAPER JAMS**.]
PC FAIL OR BUSY	• The fax function cannot be operated by the PC. The RS232C cable id not connected correctly, or the software is not running on the PC.
PLEASE WAIT	• The unit is checking that there is no slack on the film. Wait for a while.
POLLING ERROR	• The other party's fax machine does not provide the polling function. Check with the other party.
REDIAL TIME OUT	• The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	• The document is jammed. Remove the jammed document. • Attempted to transmit a document longer than 600 mm ($23^{5}/_{6}$"). Press the STOP to remove the document. Divide the document into two or more sheets and try again. [Alternately, turn off service code #559 to enable sending of documents longer than 600 mm.] (Refer to **2.2.1. DOCUMENT JAMS**)
TRANSMIT ERROR	• A transmission error occurred. Try again.
UNIT OVERHEATED	• The unit is too hot. Let the unit cool down. [If many copies are nearly all black, this message will be displayed. When this occurs, open the front cover and let the unit cool down.]

Note:

The explanations given in the [ ] are for servicemen only.

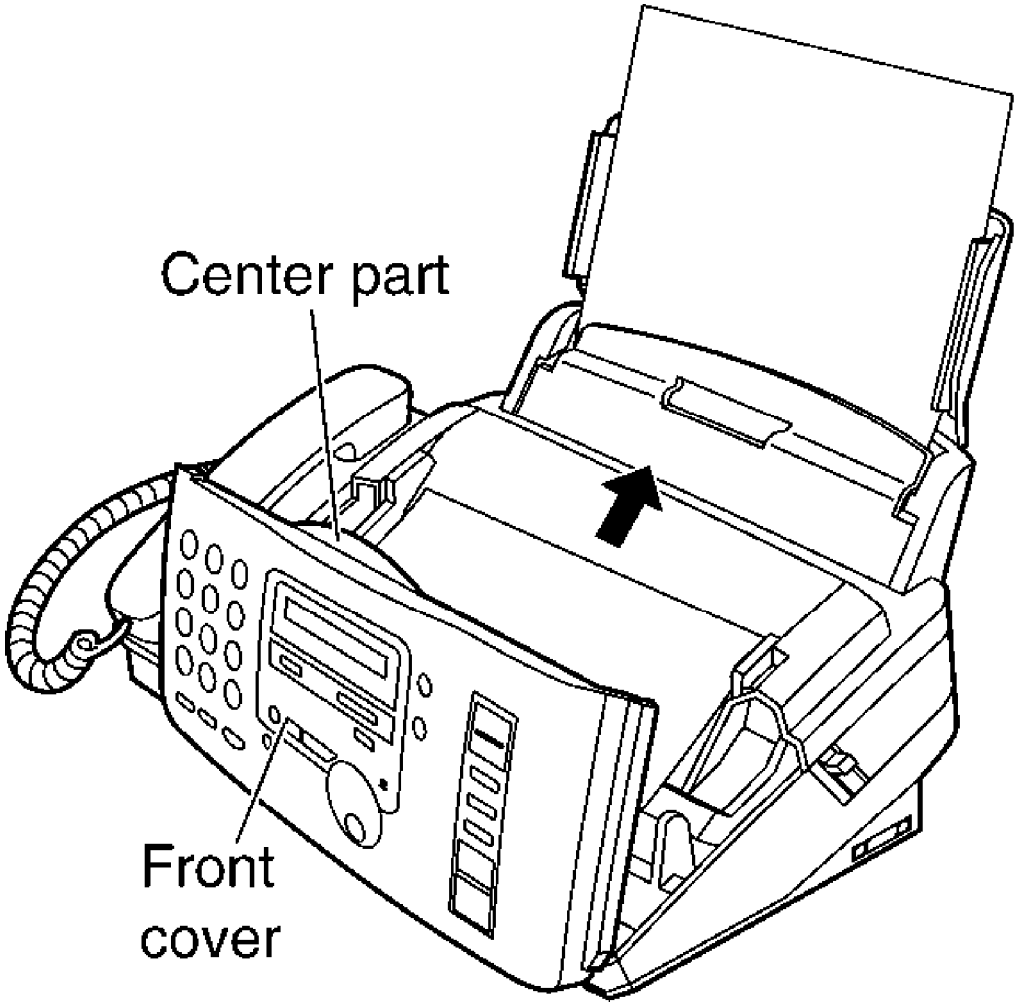
Refer to LCD MESSAGES (for KX-FM189S)().

CROSS REFERENCE:
DOCUMENT JAMS()
RECORDING PAPER JAMS()

2.2.1. DOCUMENT JAMS

If the unit does not release the document during feeding, remove the jammed document as follows.

1. Open the front cover by pulling up the center part.
2. Remove the jammed document carefully.
3. Close the front cover securely.



Note:

- Do not pull out the jammed paper forcibly before opening the front cover.

2.2.2. RECORDING PAPER JAMS

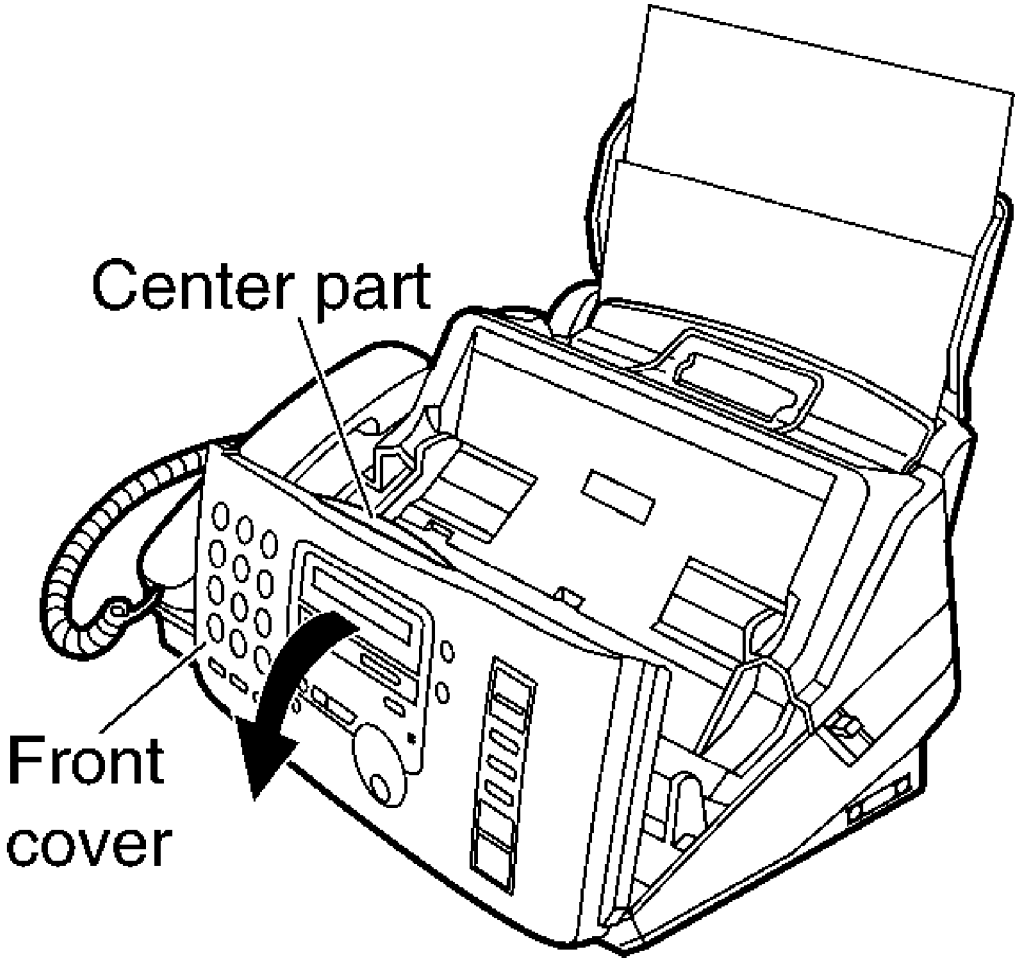
If the unit does not eject any recording paper during reception or copying, the recording paper has jammed and the display will show the following massage.When paper has jammed under the film cartridge.

Display: Refer to LCD MESSAGES (for KX-FM189S)().

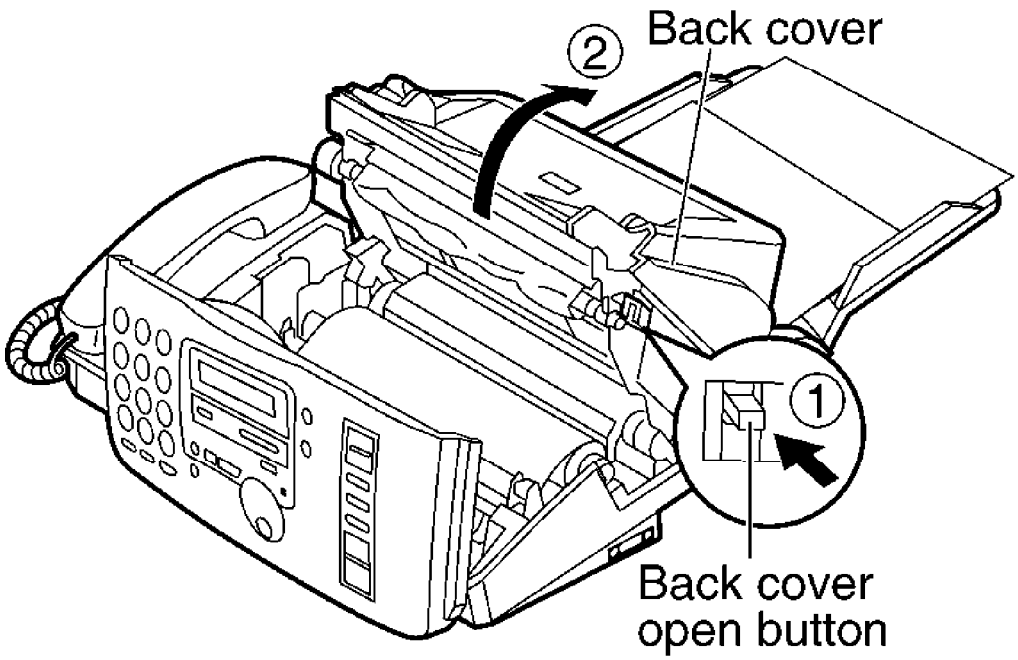
PAPER JAMMED

Remove the jammed paper as follows.

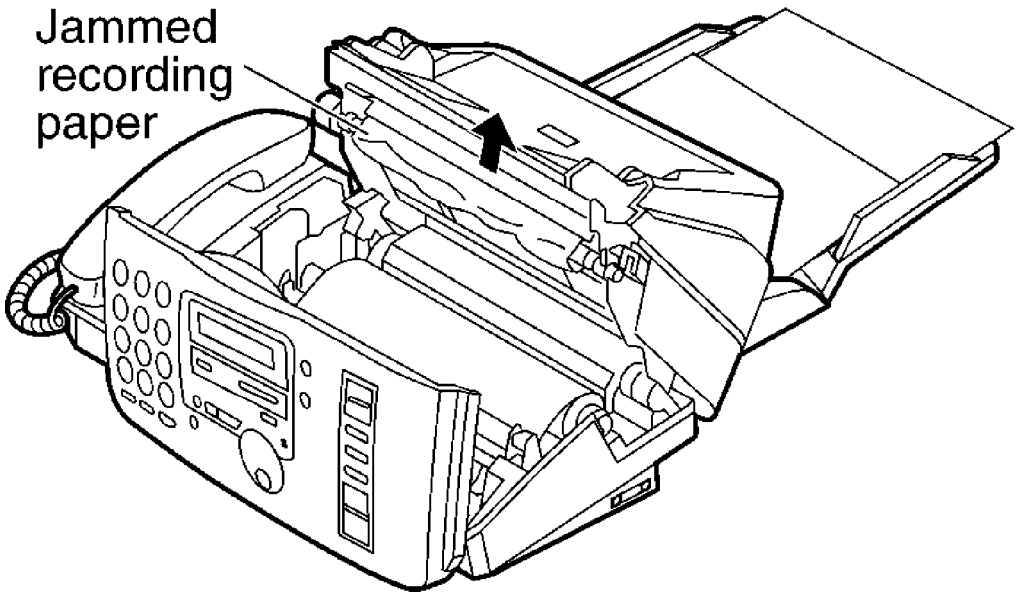
1. Open the front cover by pulling up the center part.



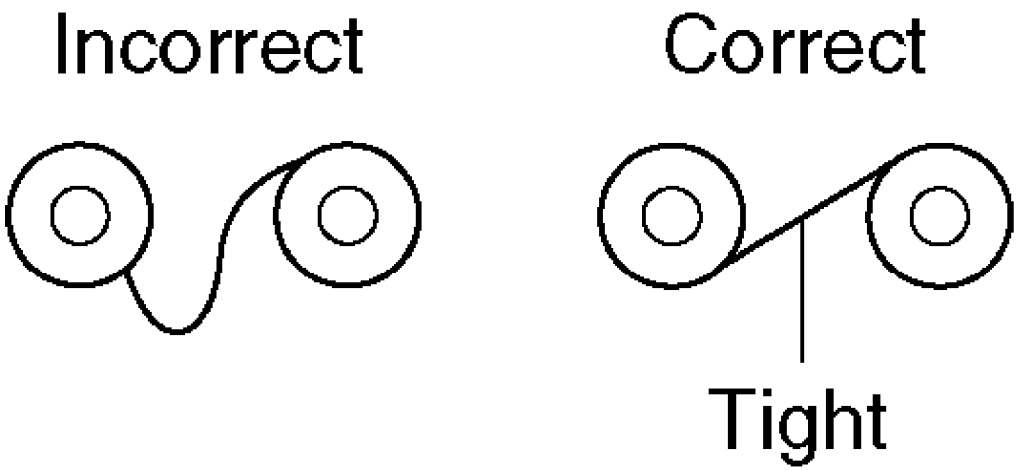
2. Push the back cover open button (①) and open the back cover (②).



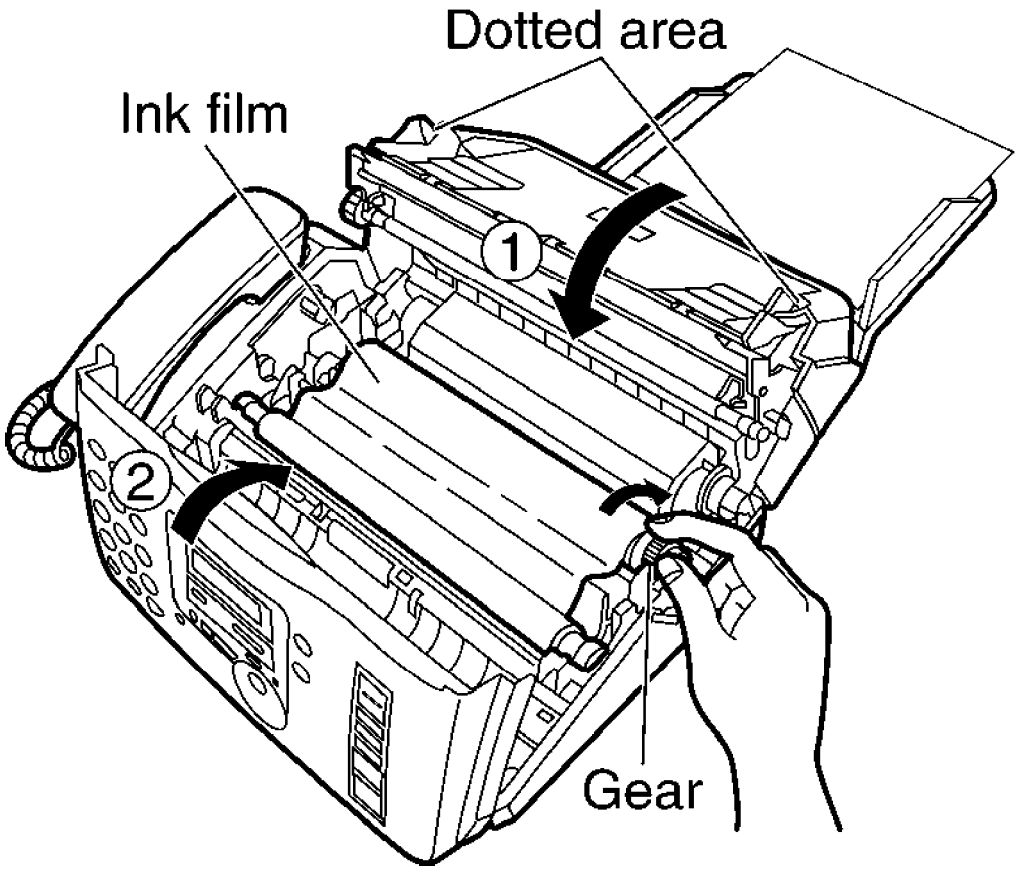
3. Remove the jammed recording paper.



4. If the ink film is slack, tighten it by winding the gears.



5. Close the back cover securely by pushing down on the dotted area at both ends (①). / Close the front cover securely (②).



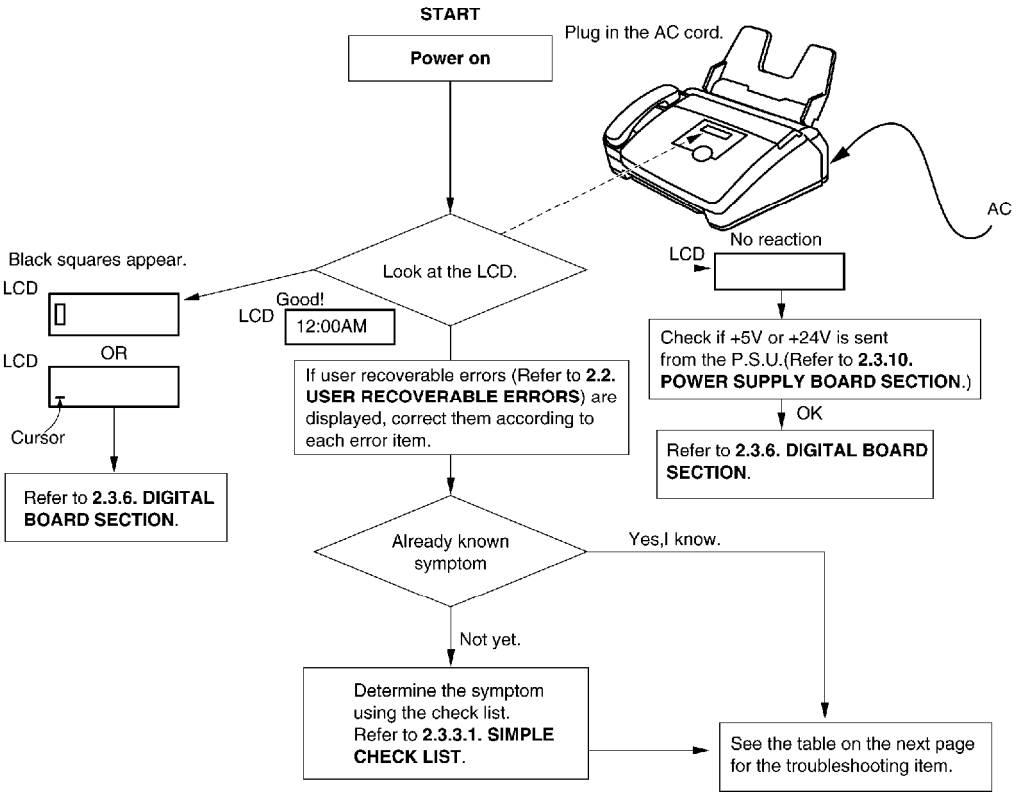
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on SIMPLE CHECK LIST(). Difficult problems may be hard to determine, so repeated testing is necessary.

2.3.2. STARTING TROUBLESHOOTING

Determine the symptom and the troubleshooting method.


START
Power on
Plug in the AC cord.
AC
Look at the LCD.
Black squares appear.
LCD
OR
LCD
Cursor
Refer to 2.3.6. DIGITAL BOARD SECTION.
Good!
LCD
12:00AM
No reaction
LCD
Check if +5V or +24V is sent from the P.S.U.(Refer to 2.3.10. POWER SUPPLY BOARD SECTION.)
OK
Refer to 2.3.6. DIGITAL BOARD SECTION.
If user recoverable errors (Refer to 2.2. USER RECOVERABLE ERRORS) are displayed, correct them according to each error item.
Already known symptom
Yes,I know.
Not yet.
Determine the symptom using the check list. Refer to 2.3.3.1. SIMPLE CHECK LIST.
See the table on the next page for the troubleshooting item.

CROSS REFERENCE:

USER RECOVERABLE ERRORS()
SIMPLE CHECK LIST()
DIGITAL BOARD SECTION()
POWER SUPPLY BOARD SECTION()

2.3.3. TROUBLESHOOTING ITEMS TABLE

ITEM	SYMPTOM	REFERENCE
ADF (Auto Document Feeder)	The document does not feed. Document jam Multiple feed Skew	See **2.3.4. ADF (Auto document feed) SECTION**.
Recording paper feed	The recording paper does not feed. Paper jam Multiple feed and skew	See **2.3.4. ADF (Auto document feed) SECTION**.
Printing	The sent fax data is skewed. The received fax data is skewed. The received or copied data is expanded. A blank page is copied. A blank page is received. Black or white vertical line Black or white lateral line An abnormal image is printed.	See **2.3.4. ADF (Auto document feed) SECTION**.
Communication FAX, TEL (analog board)	Cannot communicate by fax. An error code is displayed.	See **2.3.5. COMMUNICATION SECTION**.
	Cannot talk. The DTMF tone doesn't work. The handset/monitor doesn't work, etc.	See **2.3.8. ANALOG BOARD SECTION**.
Operation panel	Keys are not accepted.	See **2.3.11. OPERATION PANEL SECTION**.
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	See **2.3.12. SENSOR SECTION**.

CROSS REFERENCE:

ADF (Auto Document Feed) SECTION()
COMMUNICATION SECTION()
ANALOG BOARD SECTION()
OPERATION PANEL SECTION()
SENSOR SECTION()

2.3.3.1. SIMPLE CHECK LIST

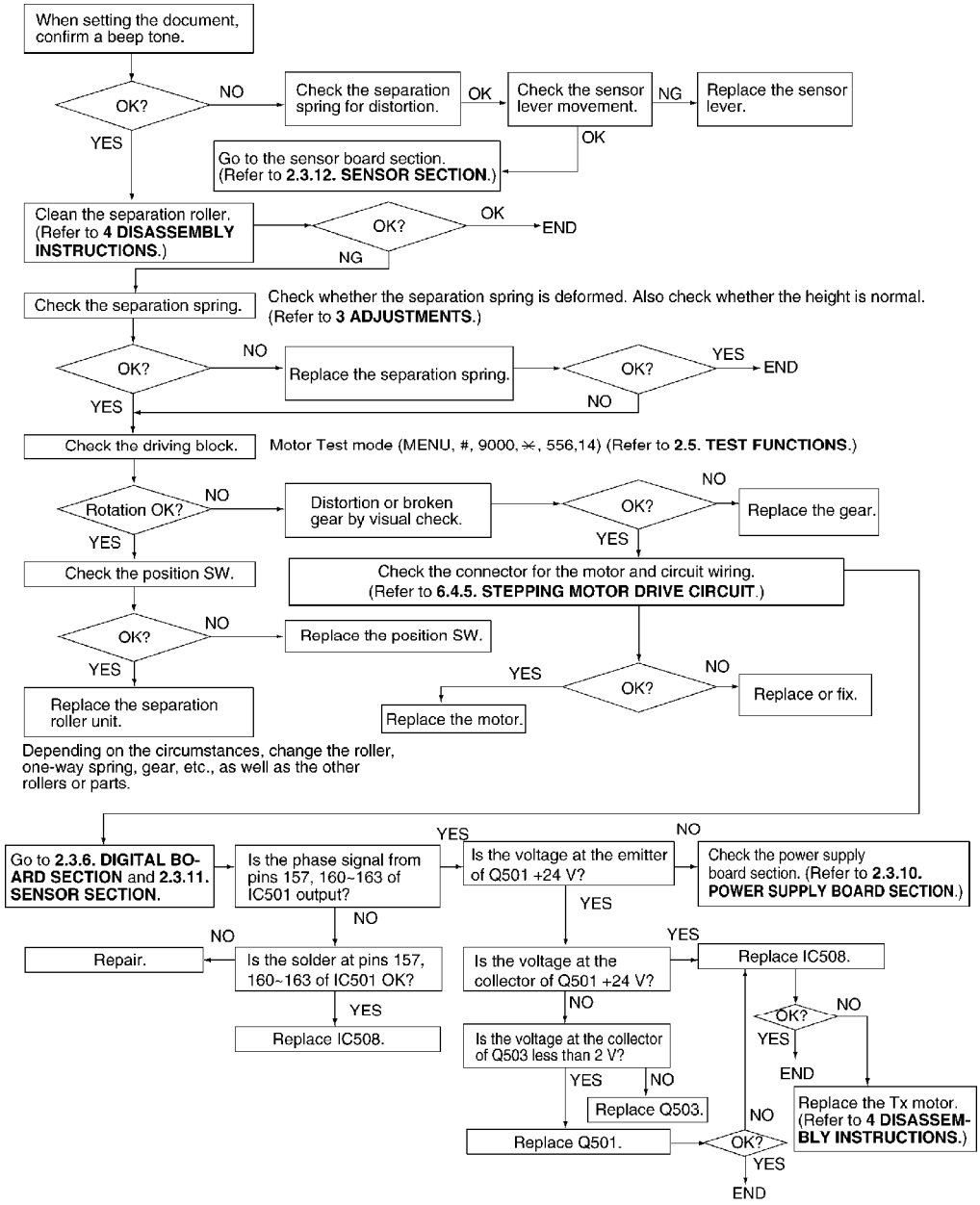
SERIAL NO. _____ DATE _____

FUNCTION		JUDGMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
Telephone operation	Handset transceiver/ receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code 815※
Operation panel	Key check	OK / NG	Service code 561※
	LED check	OK / NG	Service code 557※
	LCD check	OK / NG	Service code 558※
Sensor	Sensor check	OK / NG	Service code 815※
Clock	Display changing	OK / NG	Is the time kept correctly? Check with another clock.
Digital Speakerphone		OK / NG	
Digital TAM	Greeting Rec/Play	OK / NG	
	Incoming message Rec/Play	OK / NG	
	Memo Rec/Play	OK / NG	
Voice prompt		OK / NG	SERVICE CODE 784 Check whether voice prompt is play or not.

Note:
Check according to the service code referring to TEST FUNCTIONS()

2.3.4. ADF (Auto Document Feed) SECTION

2.3.4.1. NO DOCUMENT FEED



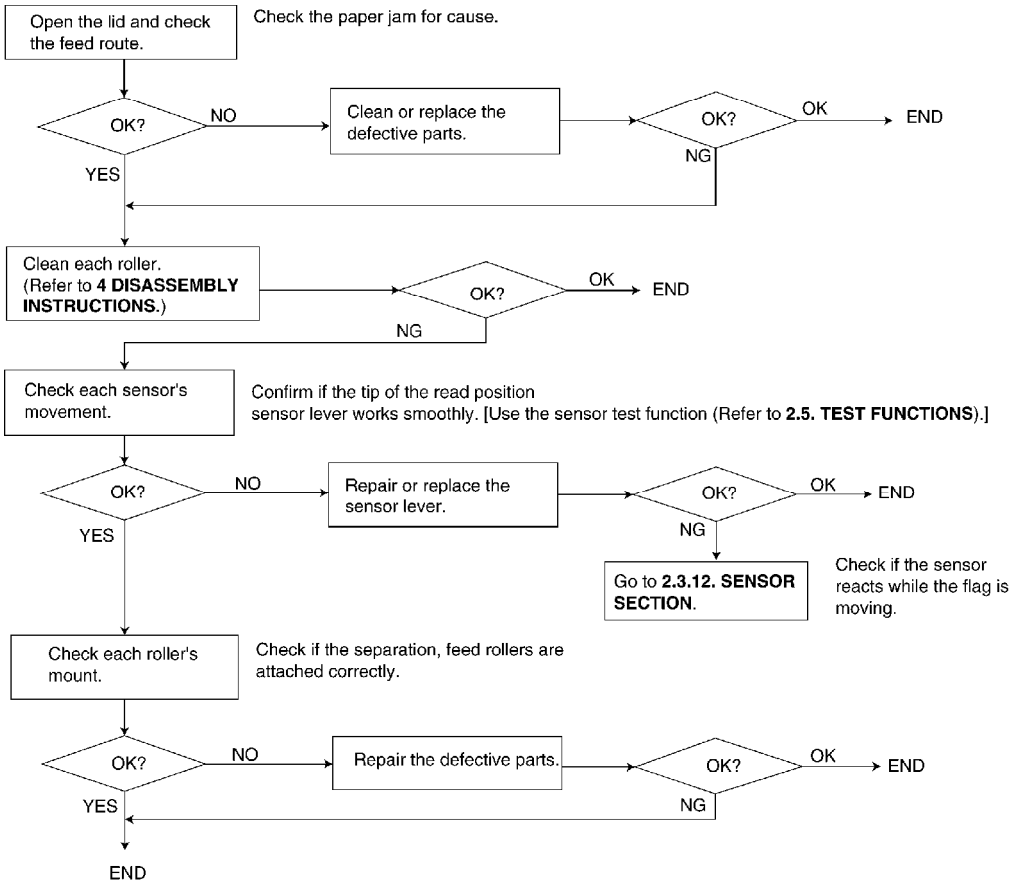
CROSS REFERENCE:

DIGITAL BOARD SECTION()
POWER SUPPLY BOARD SECTION()
SENSOR SECTION()
TEST FUNCTIONS()
ADJUSTMENTS()
DISASSEMBLY INSTRUCTIONS()
STEPPING MOTOR DRIVE CIRCUIT()

Note:

When using thin paper etc., sometimes the document will not feed. Refer to ADJUSTING THE FEEDER PRESSURE().

2.3.4.2. DOCUMENT JAM



CROSS REFERENCE:
SENSOR SECTION()
TEST FUNCTIONS()
DISASSEMBLY INSTRUCTIONS()

2.3.4.3. MULTIPLE FEED

- When using thick paper etc., sometimes the document will not be fed.
Refer to ADJUSTING THE FEEDER PRESSURE().

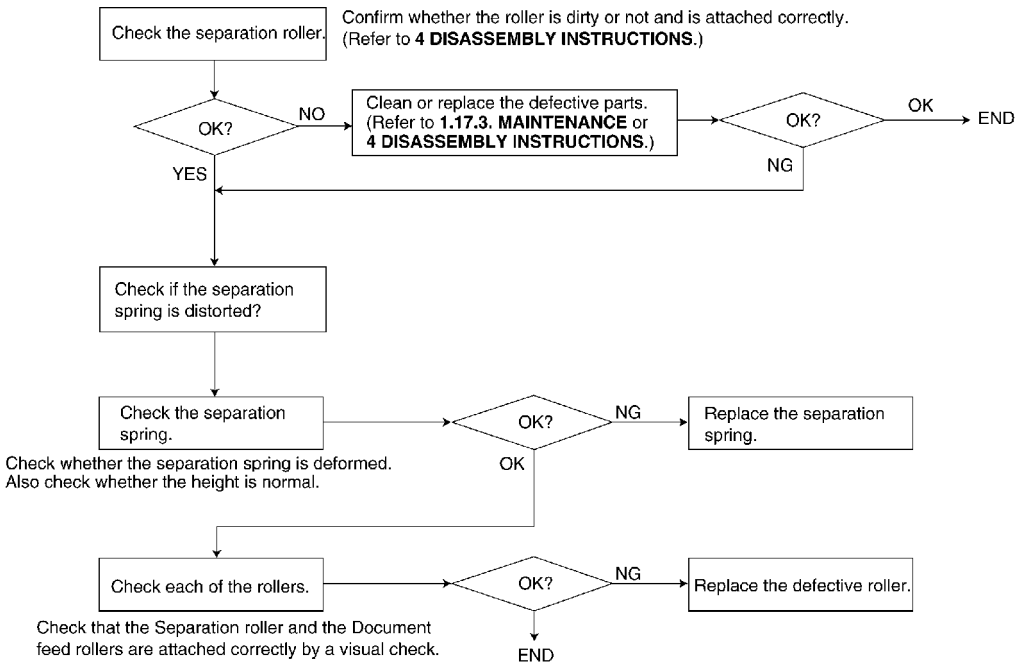
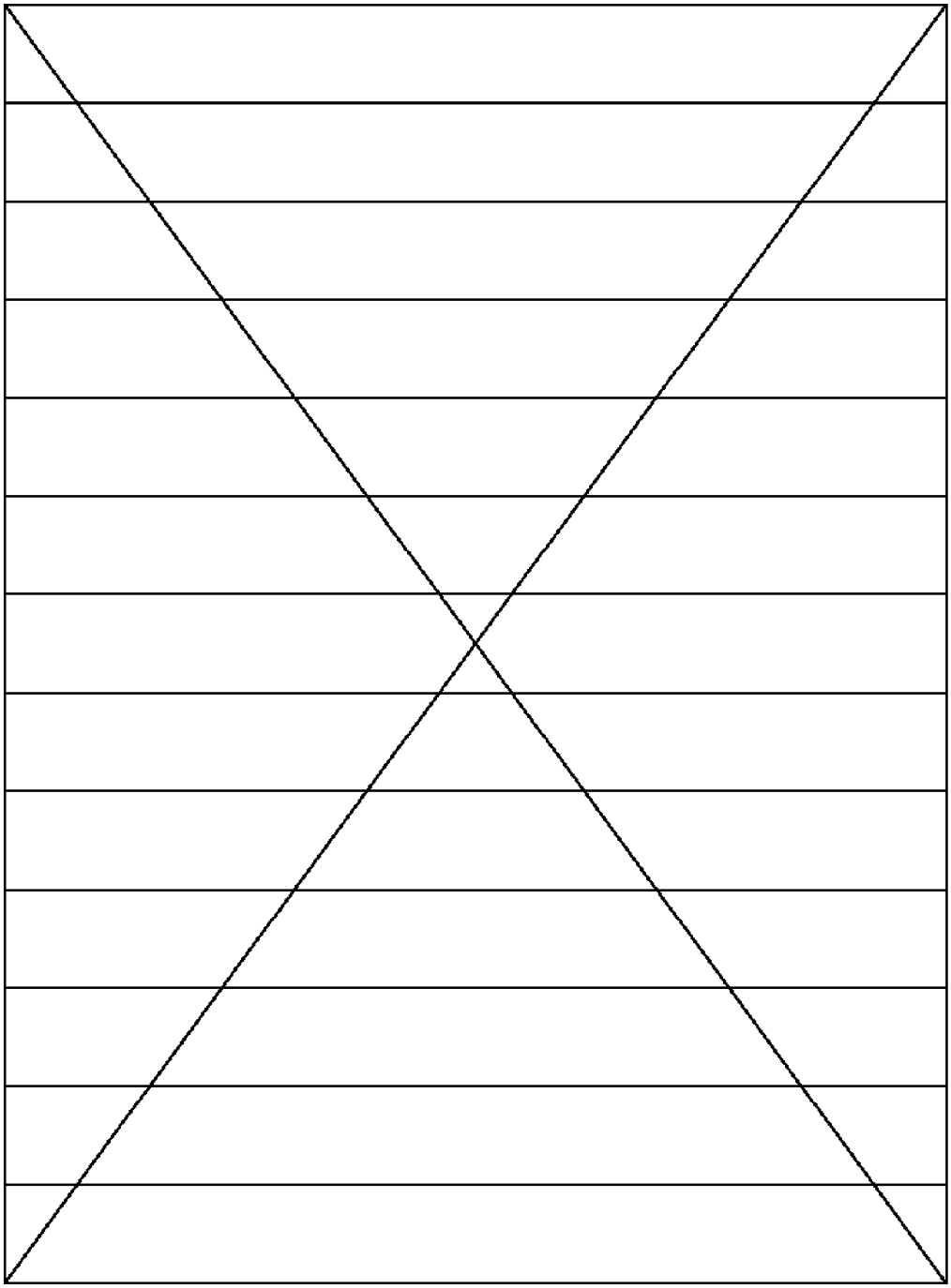

Check the separation roller.
Confirm whether the roller is dirty or not and is attached correctly.
(Refer to 4 DISASSEMBLY INSTRUCTIONS.)
OK?
NO
YES
Clean or replace the defective parts.
(Refer to 1.17.3. MAINTENANCE or
4 DISASSEMBLY INSTRUCTIONS.)
OK?
OK
END
NG
Check if the separation
spring is distorted?
Check the separation
spring.
Check whether the separation spring is deformed.
Also check whether the height is normal.
OK?
NG
Replace the separation
spring.
OK
Check each of the rollers.
Check that the Separation roller and the Document
feed rollers are attached correctly by a visual check.
OK?
NG
Replace the defective roller.
END

Fig. B

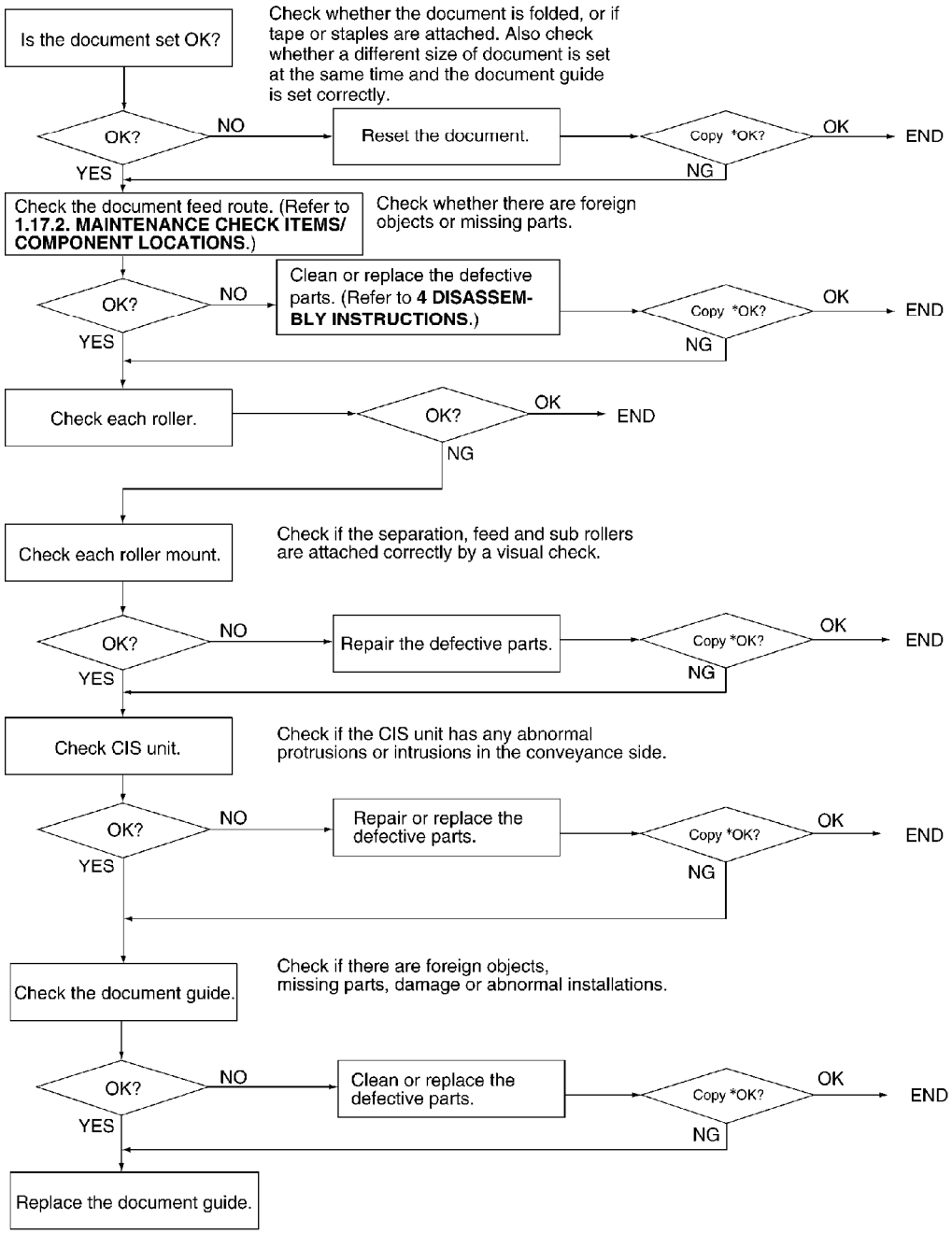


CROSS REFERENCE:
MAINTENANCE()
DISASSEMBLY INSTRUCTIONS()

Note:

When confirming if the characters are extended or distorted, or if the feed problem is occurred, use this test chart format (Fig. B).

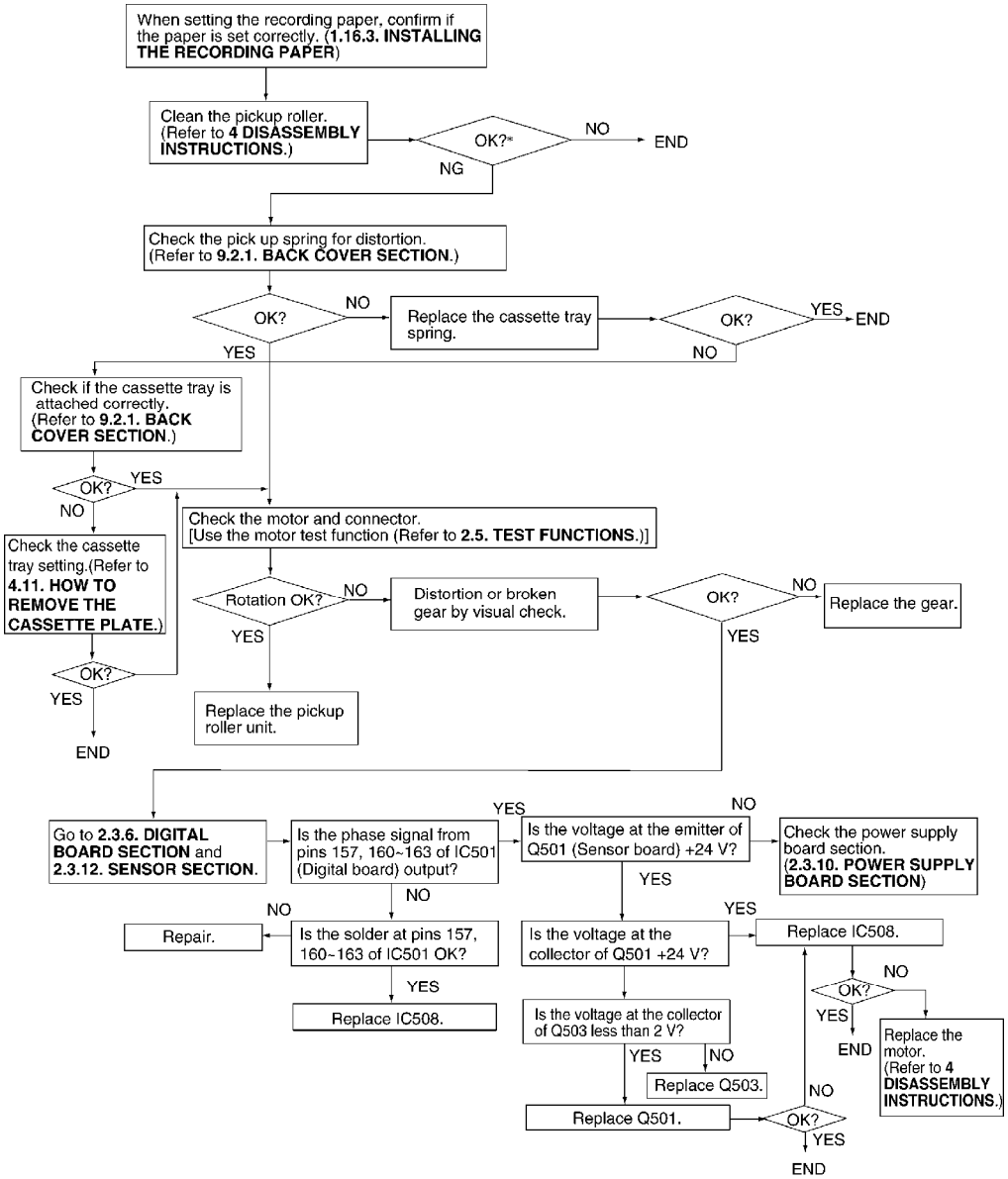
2.3.4.4. SKEW



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED () and using it.**

CROSS REFERENCE:
MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS()
DISASSEMBLY INSTRUCTIONS()

2.3.4.5. THE RECORDING PAPER DOES NOT FEED

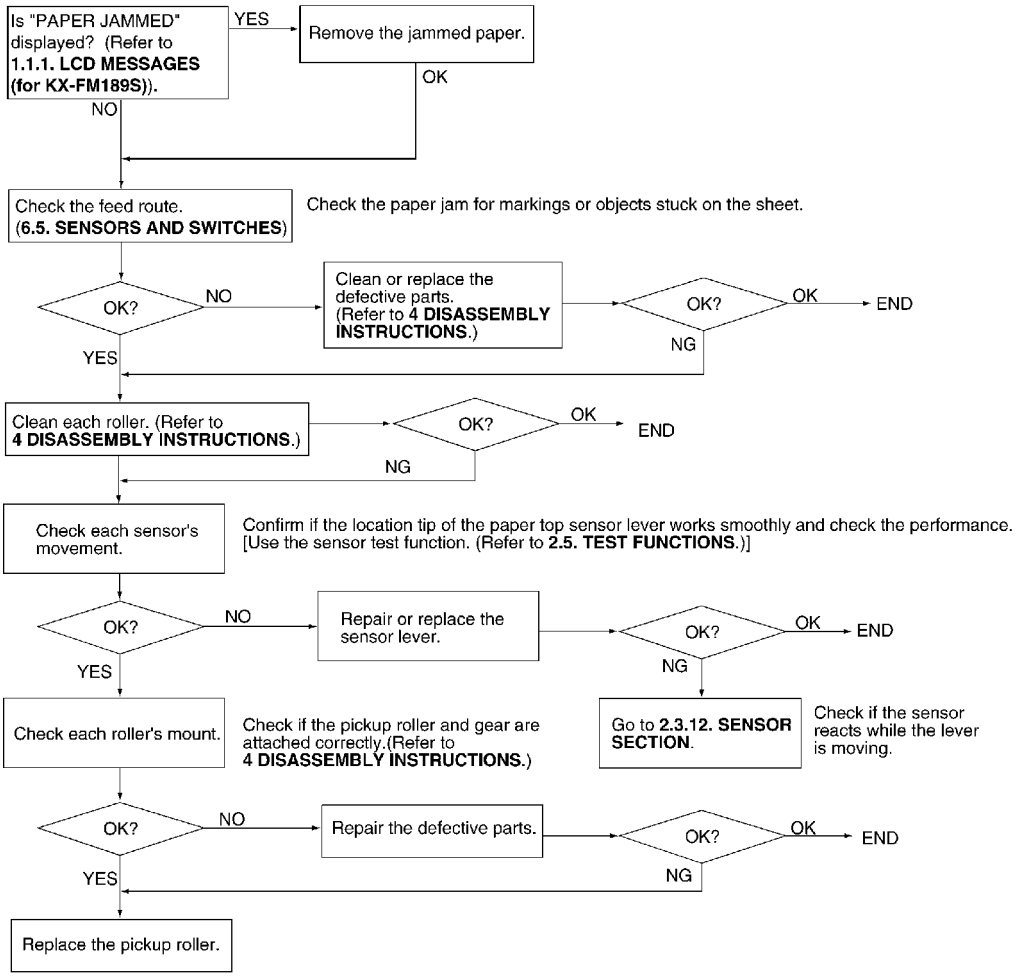


*** We recommend making a copy of the Fig. B document in MULTIPLE FEED ()and using it.**

CROSS REFERENCE:

INSTALLING THE RECORDING PAPER()
DIGITAL BOARD SECTION()
POWER SUPPLY BOARD SECTION()
SENSOR SECTION()
TEST FUNCTIONS()
DISASSEMBLY INSTRUCTIONS()
HOW TO REMOVE THE CASSETTE PLATE()
BACK COVER SECTION()

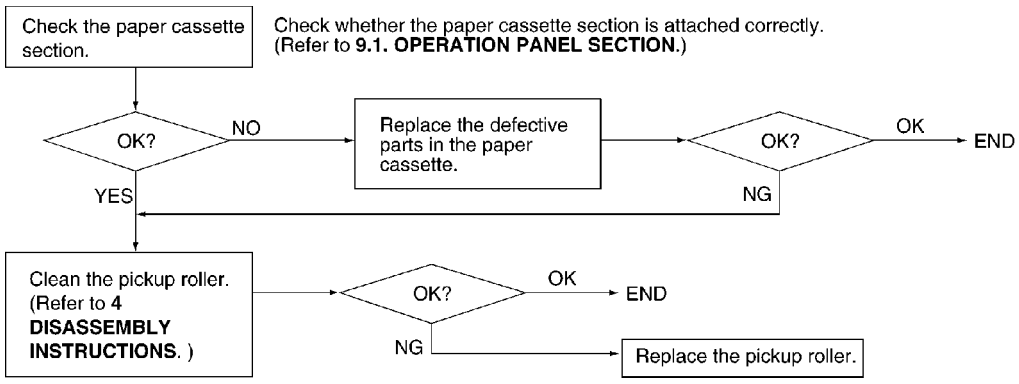
2.3.4.6. PAPER JAM



CROSS REFERENCE:

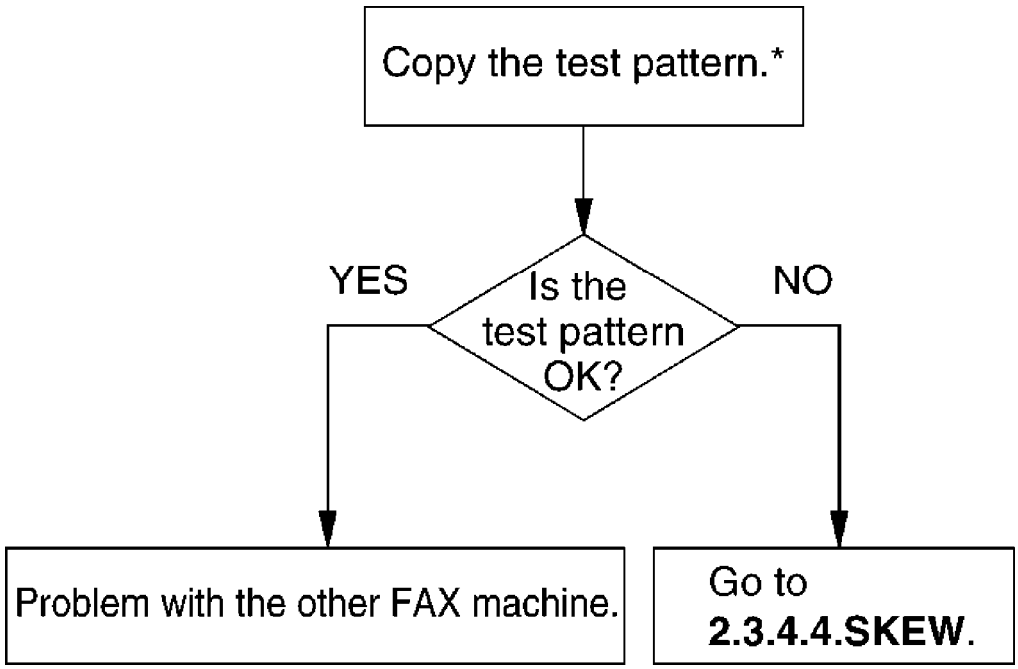
LCD MESSAGES (for KX-FM189S)()
SENSOR SECTION()
TEST FUNCTIONS()
DISASSEMBLY INSTRUCTIONS()
SENSORS AND SWITCHES()

2.3.4.7. MULTIPLE FEED AND SKEW



CROSS REFERENCE:
DISASSEMBLY INSTRUCTIONS()
OPERATION PANEL SECTION()

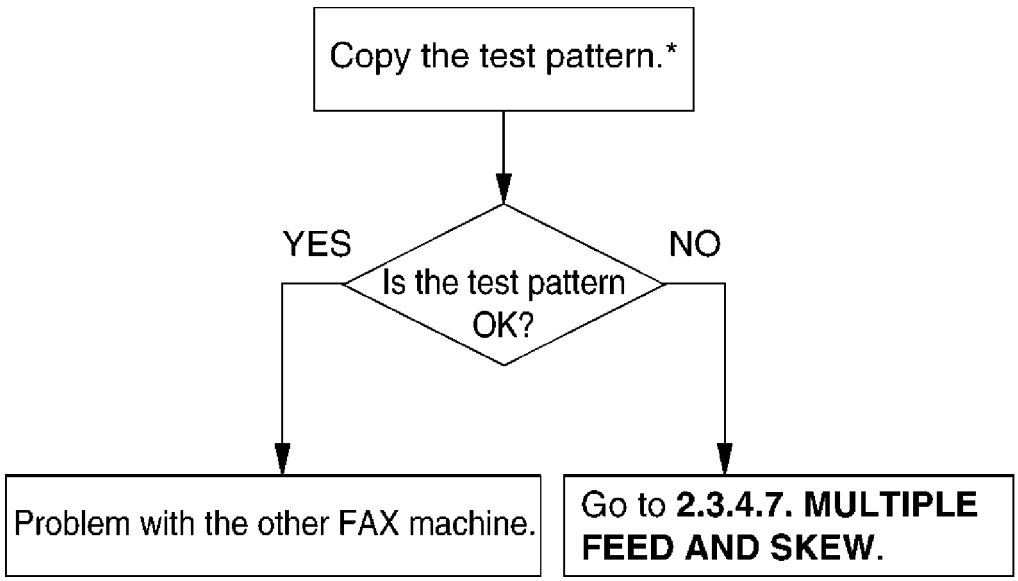
2.3.4.8. THE SENT FAX DATA IS SKEWED



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED() and using it.**

CROSS REFERENCE:
SKEW()

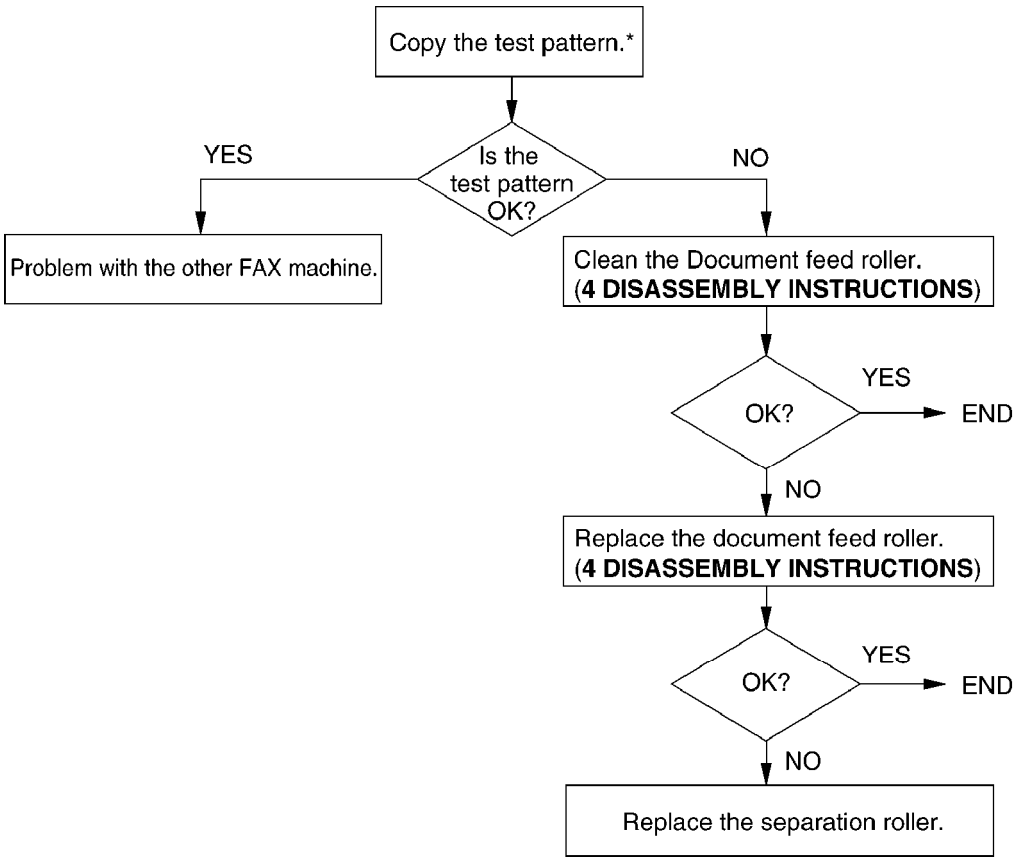
2.3.4.9. THE RECEIVED FAX DATA IS SKEWED



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED() and using it.**

CROSS REFERENCE:
MULTIPLE FEED AND SKEW()

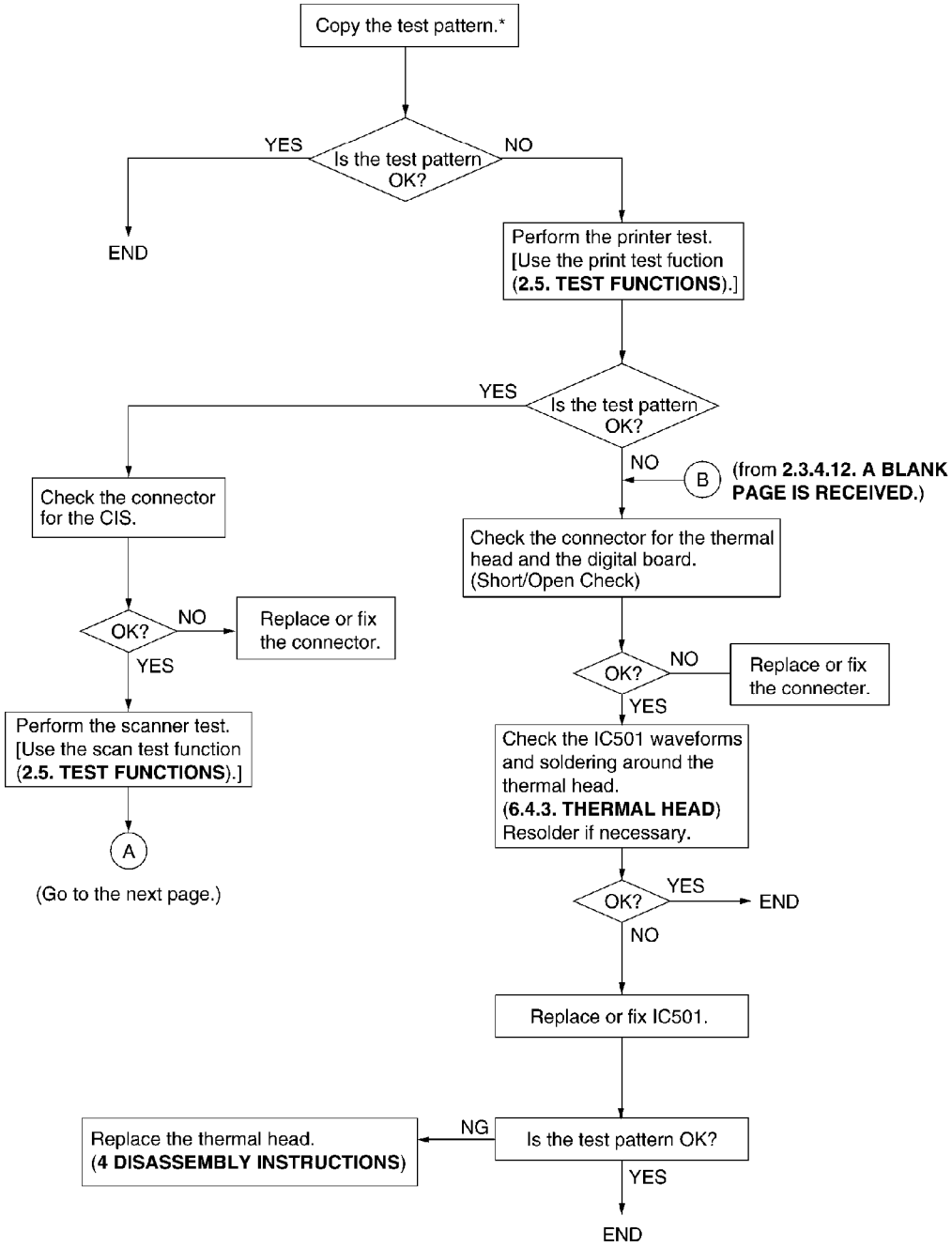
2.3.4.10. RECEIVED OR COPIED DATA IS EXPANDED



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED() and using it.**

CROSS REFERENCE:
DISASSEMBLY INSTRUCTIONS()

2.3.4.11. A BLANK PAGE IS COPIED



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED () and using it.**

CROSS REFERENCE:

A BLANK PAGE IS RECEIVED()

TEST FUNCTIONS()

DISASSEMBLY INSTRUCTIONS()

THERMAL HEAD()

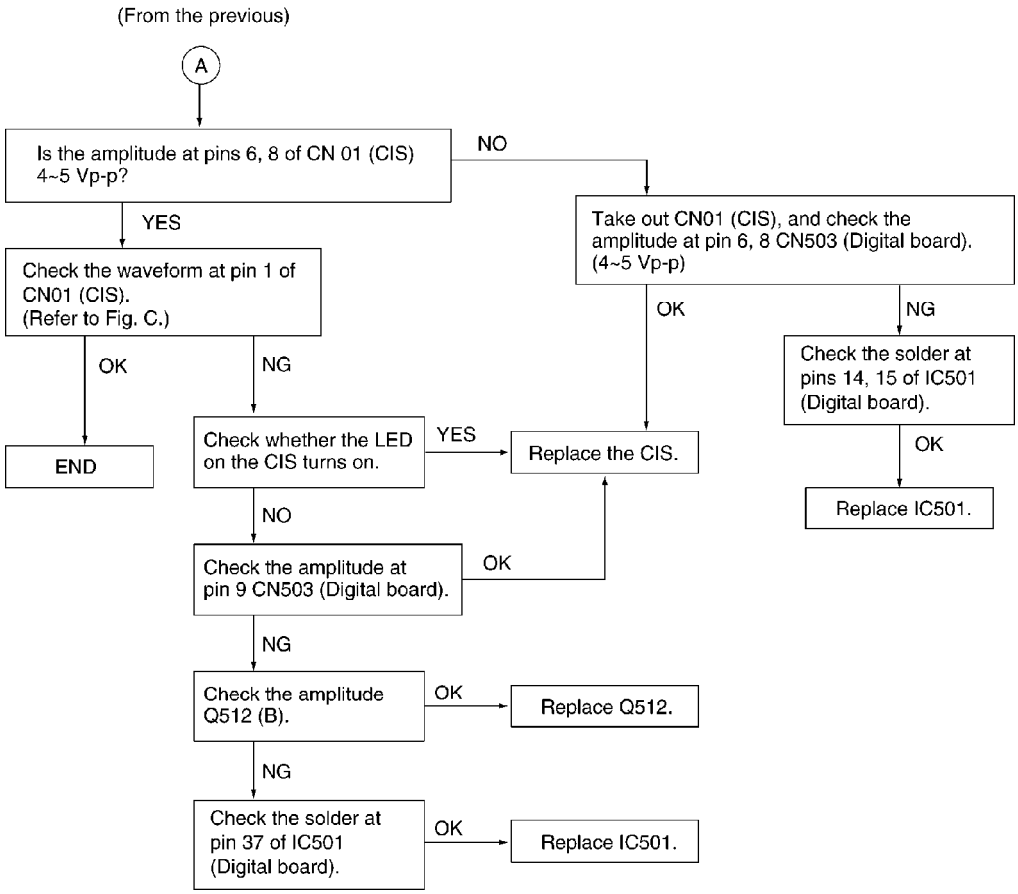
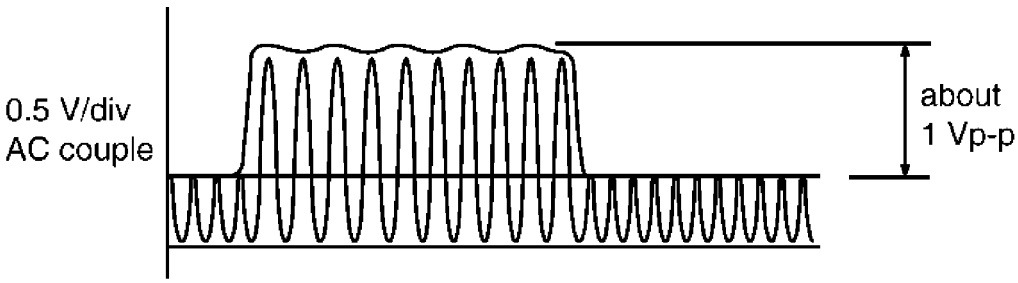
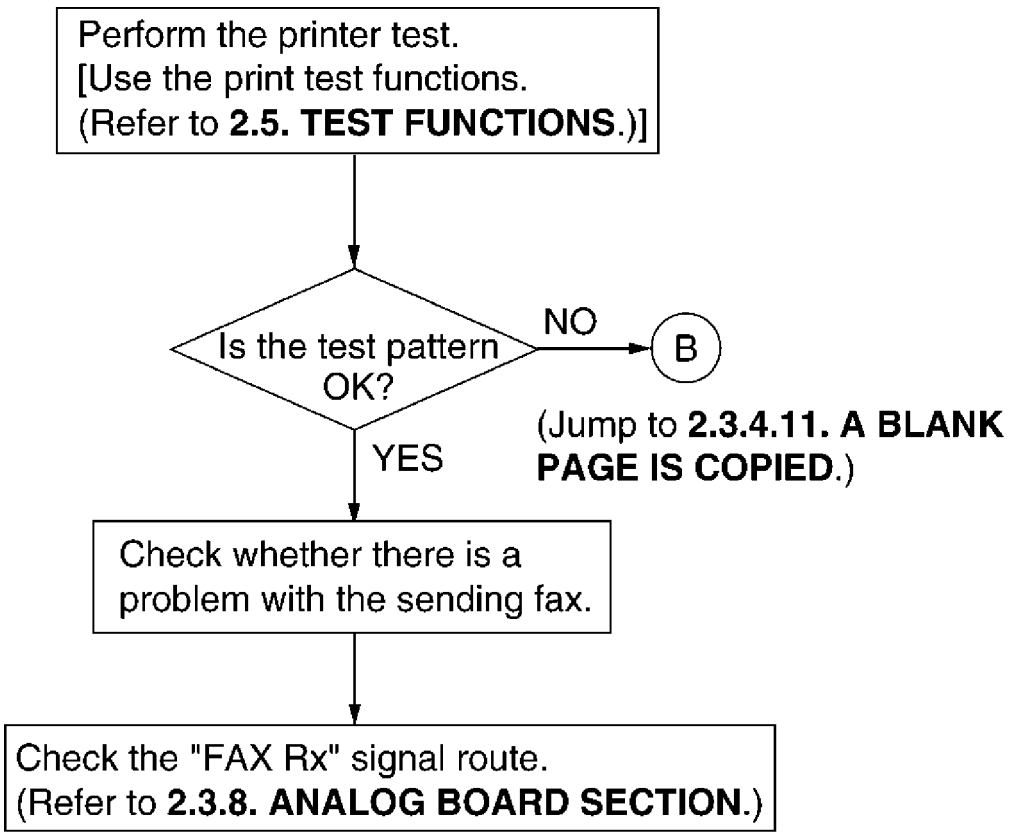

(From the previous)
A
Is the amplitude at pins 6, 8 of CN 01 (CIS) 4~5 Vp-p?
NO
YES
Take out CN01 (CIS), and check the amplitude at pin 6, 8 CN503 (Digital board). (4~5 Vp-p)
Check the waveform at pin 1 of CN01 (CIS). (Refer to Fig. C.)
OK
NG
NG
Check the solder at pins 14, 15 of IC501 (Digital board).
OK
END
Check whether the LED on the CIS turns on.
YES
Replace the CIS.
Replace IC501.
NO
Check the amplitude at pin 9 CN503 (Digital board).
OK
NG
Check the amplitude Q512 (B).
OK
Replace Q512.
NG
Check the solder at pin 37 of IC501 (Digital board).
OK
Replace IC501.

Fig. C

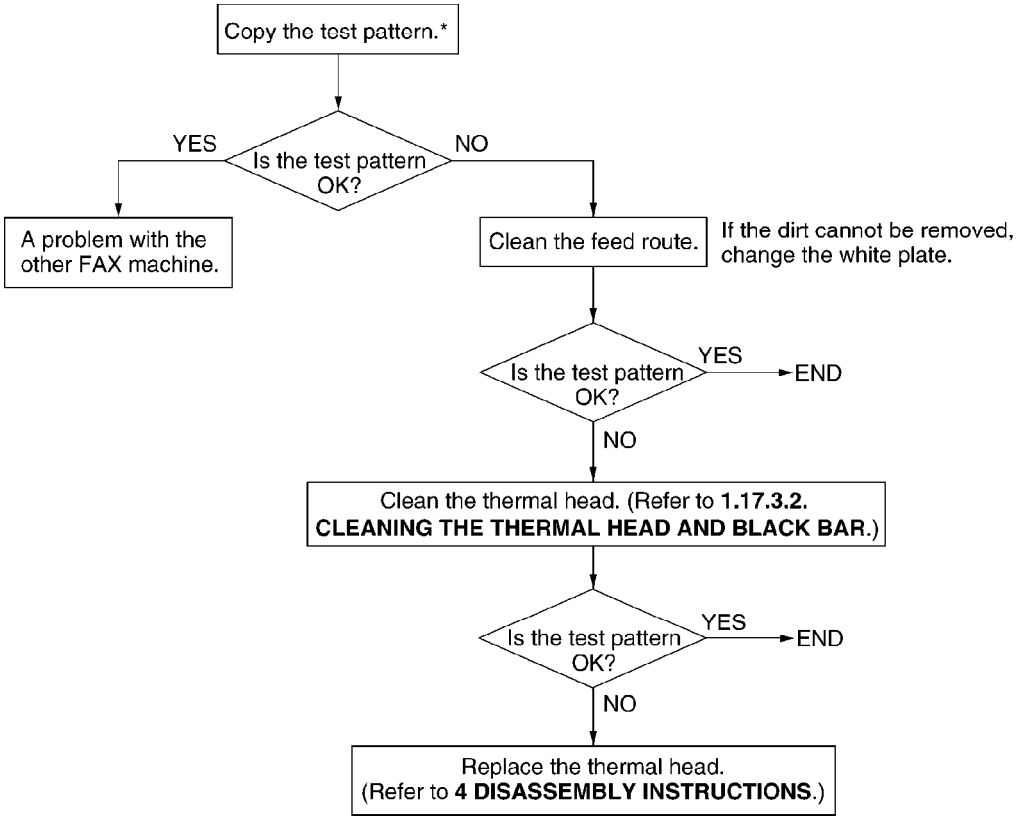


2.3.4.12. A BLANK PAGE IS RECEIVED


Perform the printer test.
[Use the print test functions.
(Refer to 2.5. TEST FUNCTIONS.)]
Is the test pattern OK?
NO
B
(Jump to 2.3.4.11. A BLANK PAGE IS COPIED.)
YES
Check whether there is a problem with the sending fax.
Check the "FAX Rx" signal route.
(Refer to 2.3.8. ANALOG BOARD SECTION.)

CROSS REFERENCE:
A BLANK PAGE IS COPIED()
ANALOG BOARD SECTION()
TEST FUNCTIONS()

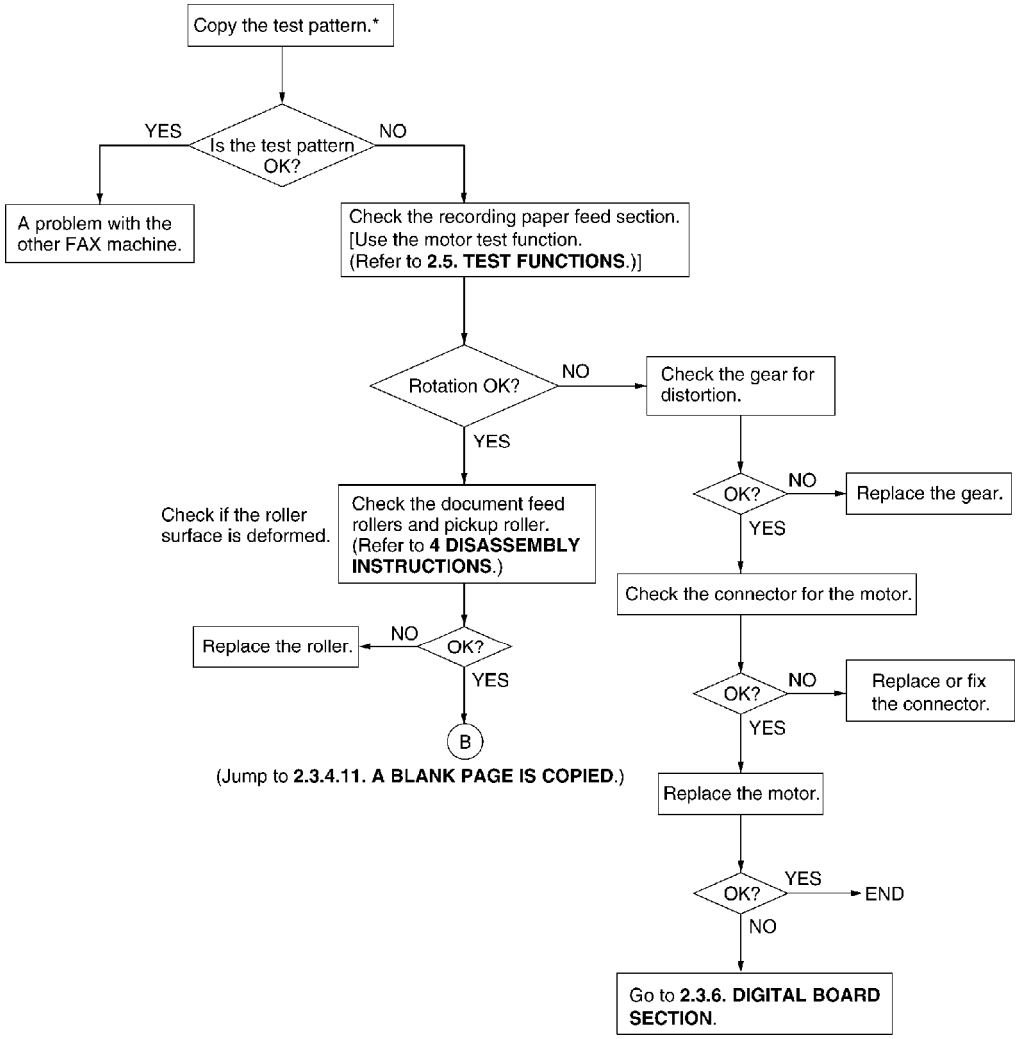
2.3.4.13. BLACK OR WHITE VERTICAL LINE


Copy the test pattern.*
YES
Is the test pattern OK?
NO
A problem with the other FAX machine.
Clean the feed route.
If the dirt cannot be removed, change the white plate.
Is the test pattern OK?
YES
END
NO
Clean the thermal head. (Refer to 1.17.3.2. CLEANING THE THERMAL HEAD AND BLACK BAR.)
Is the test pattern OK?
YES
END
NO
Replace the thermal head. (Refer to 4 DISASSEMBLY INSTRUCTIONS.)

*** We recommend making a copy of the Fig. B document in MULTIPLE FEED () and using it.**

CROSS REFERENCE:
CLEANING THE THERMAL HEAD AND BLACK BAR()
DISASSEMBLY INSTRUCTIONS()

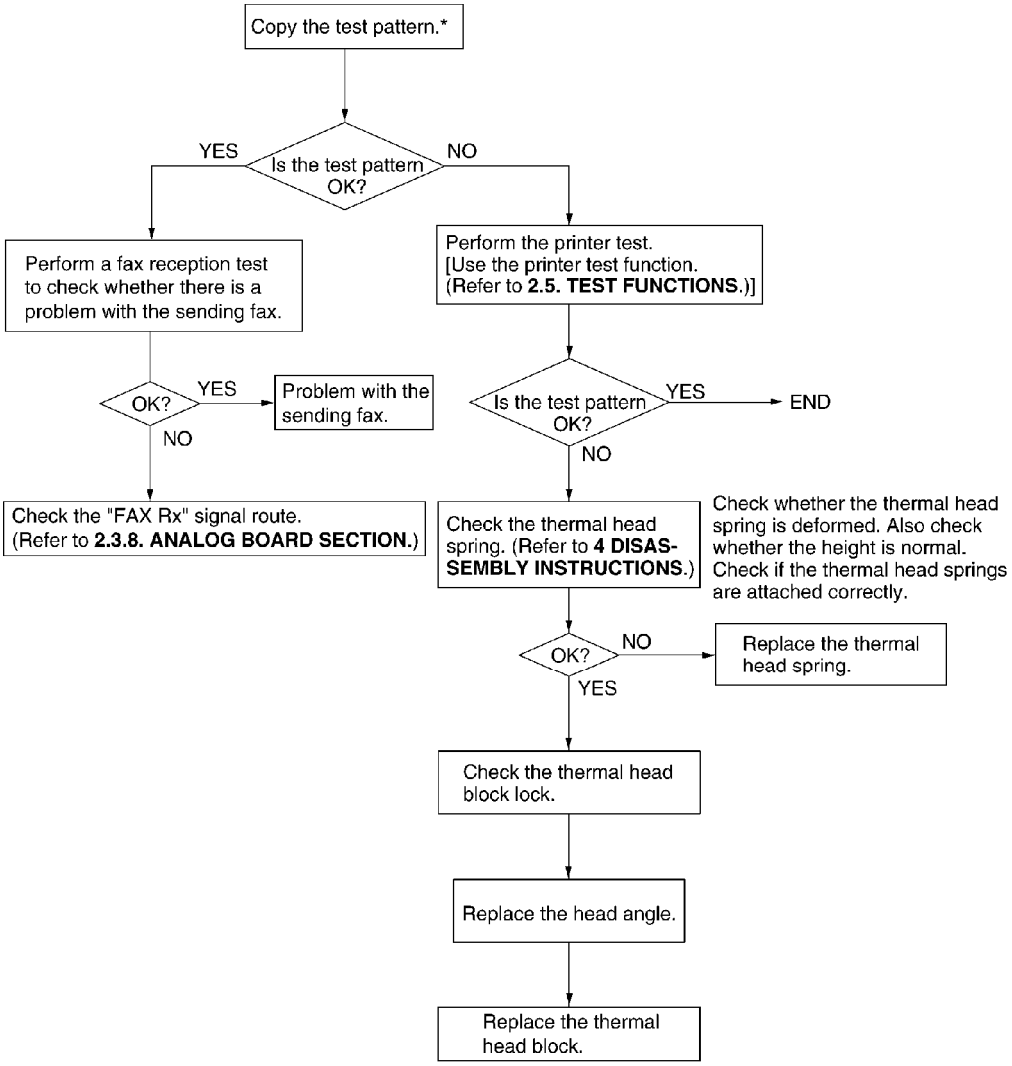
2.3.4.14. BLACK OR WHITE LATERAL LINE ON PRINT OUT



*** We recommend making a copy of the Fig. B document in MULTIPLE FEED() and using it.**

CROSS REFERENCE:
A BLANK PAGE IS COPIED()
DIGITAL BOARD SECTION()
TEST FUNCTIONS()
DISASSEMBLY INSTRUCTIONS()

2.3.4.15. AN ABNORMAL IMAGE IS PRINTED


Copy the test pattern.*
Is the test pattern OK?
YES
NO
Perform a fax reception test to check whether there is a problem with the sending fax.
Perform the printer test. [Use the printer test function. (Refer to 2.5. TEST FUNCTIONS.)]
OK?
YES
Problem with the sending fax.
NO
Is the test pattern OK?
YES
END
NO
Check the "FAX Rx" signal route. (Refer to 2.3.8. ANALOG BOARD SECTION.)
Check the thermal head spring. (Refer to 4 DISASSEMBLY INSTRUCTIONS.)
Check whether the thermal head spring is deformed. Also check whether the height is normal. Check if the thermal head springs are attached correctly.
OK?
NO
Replace the thermal head spring.
YES
Check the thermal head block lock.
Replace the head angle.
Replace the thermal head block.

*** We recommend making a copy of the Fig. B document in MULTIPLE FEED () and using it.**

CROSS REFERENCE:
ANALOG BOARD SECTION()
TEST FUNCTIONS()
DISASSEMBLY INSTRUCTIONS()

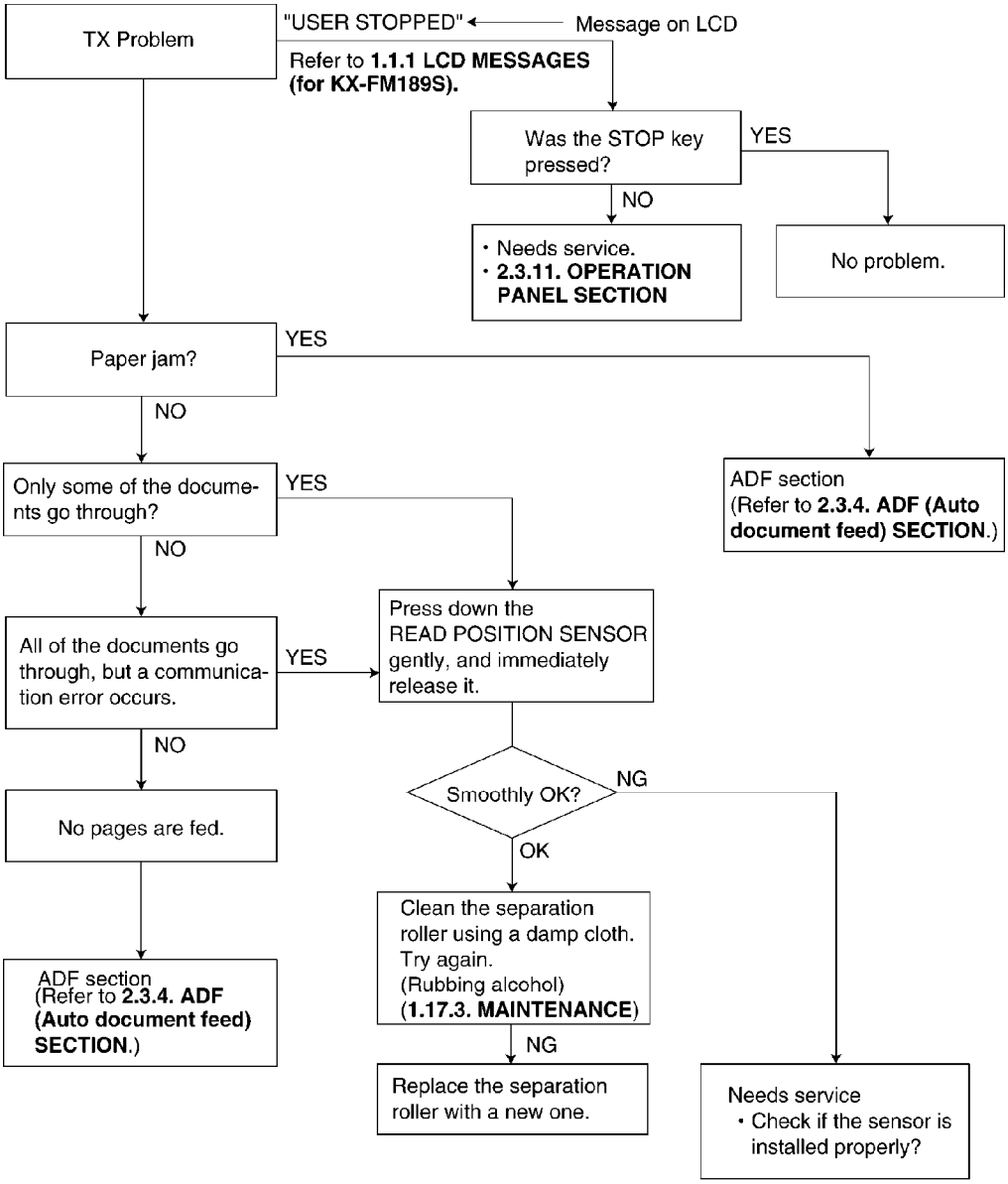
2.3.5. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in DEFECTIVE FACSIMILE SECTION().

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Nor in the copy mode.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax usually receives successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or an international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.5.1. DEFECTIVE FACSIMILE SECTION

2.3.5.1.1. TRANSMIT PROBLEM



CROSS REFERENCE:

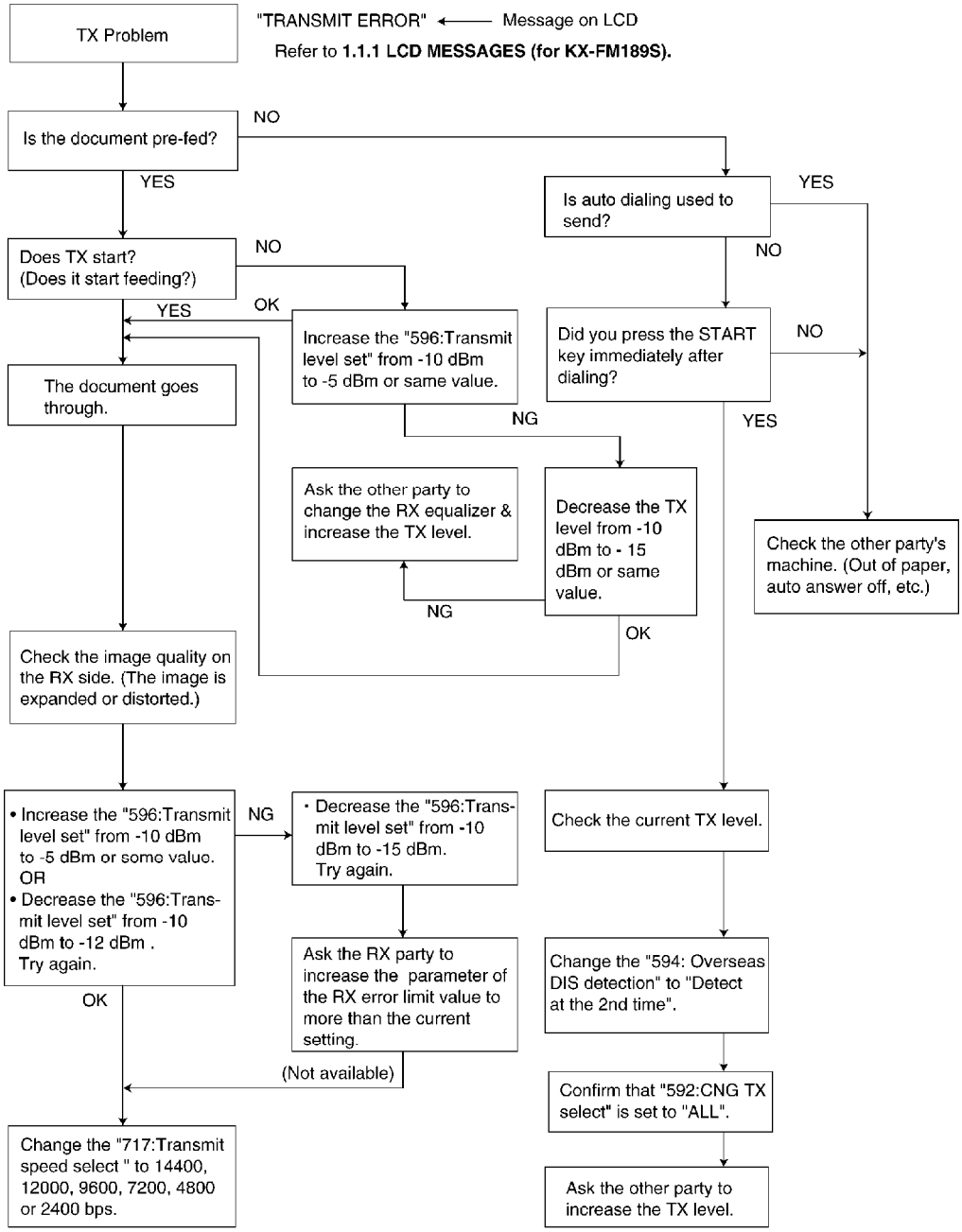
LCD MESSAGES (for KX-FM189S)()

MAINTENANCE()

ADF (Auto Document Feed) SECTION()

OPERATION PANEL SECTION()

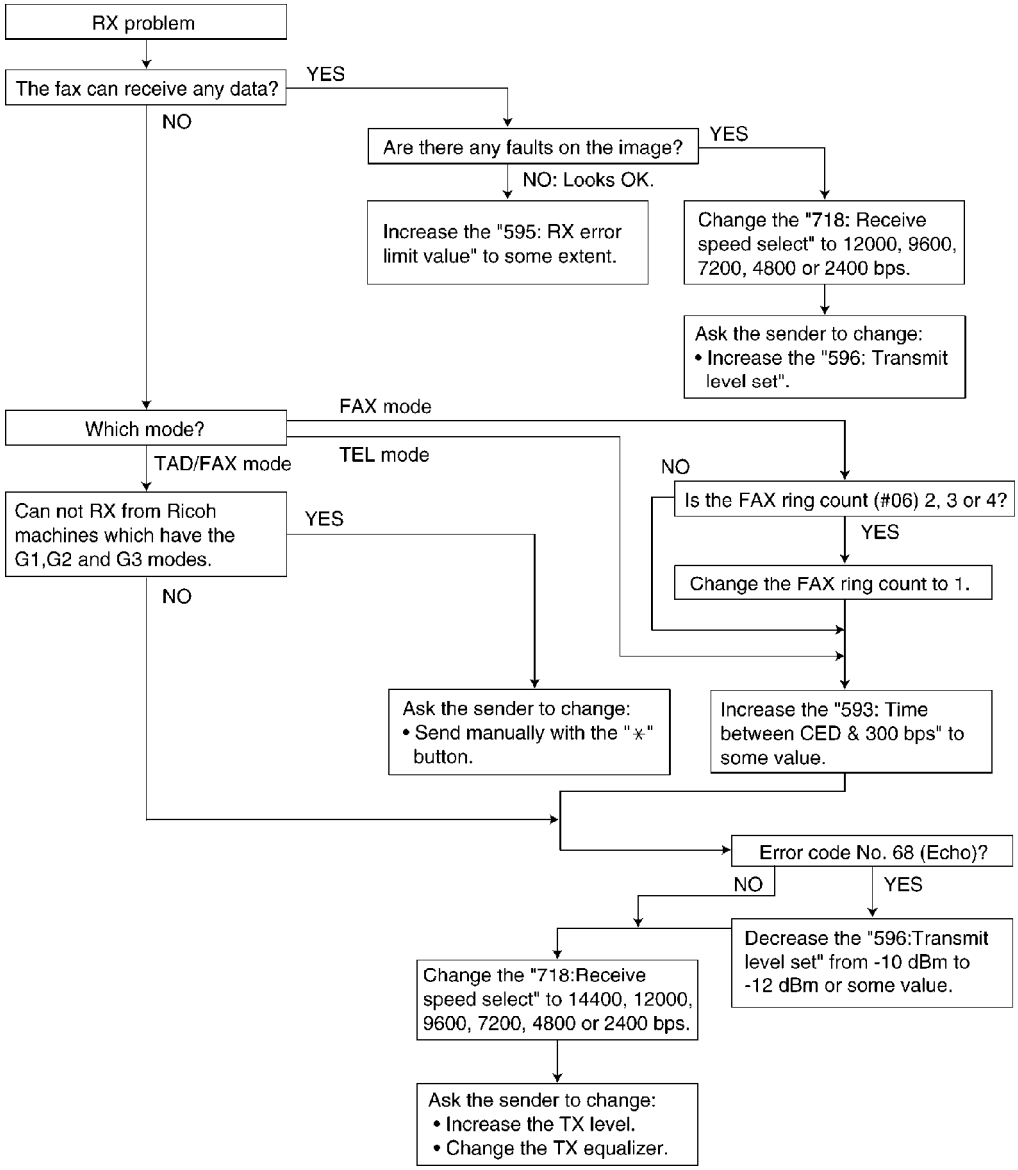
2.3.5.1.2. SOMETIME THERE IS A TRANSMIT PROBLEM


TX Problem
"TRANSMIT ERROR" ← Message on LCD
Refer to 1.1.1 LCD MESSAGES (for KX-FM189S).
Is the document pre-fed?
NO
YES
Is auto dialing used to send?
YES
NO
Does TX start? (Does it start feeding?)
NO
YES
OK
Increase the "596:Transmit level set" from -10 dBm to -5 dBm or same value.
Did you press the START key immediately after dialing?
NO
YES
The document goes through.
NG
Ask the other party to change the RX equalizer & increase the TX level.
Decrease the TX level from -10 dBm to - 15 dBm or same value.
Check the other party's machine. (Out of paper, auto answer off, etc.)
NG
OK
Check the image quality on the RX side. (The image is expanded or distorted.)
• Increase the "596:Transmit level set" from -10 dBm to -5 dBm or some value. OR • Decrease the "596:Transmit level set" from -10 dBm to -12 dBm . Try again.
NG
• Decrease the "596:Transmit level set" from -10 dBm to -15 dBm. Try again.
Check the current TX level.
OK
Ask the RX party to increase the parameter of the RX error limit value to more than the current setting.
Change the "594: Overseas DIS detection" to "Detect at the 2nd time".
(Not available)
Confirm that "592:CNG TX select" is set to "ALL".
Change the "717:Transmit speed select " to 14400, 12000, 9600, 7200, 4800 or 2400 bps.
Ask the other party to increase the TX level.

Note:
"596: Transmit level set" represents a service code. (Refer to SERVICE FUNCTION TABLE().)

CROSS REFERENCE:
LCD MESSAGES (for KX-FM189S)()

2.3.5.1.3. RECEIVE PROBLEM
First confirm whether the recording paper is installed properly or not before starting troubleshooting. (Refer to "Remarks".)


RX problem
The fax can receive any data?
YES
NO
Are there any faults on the image?
YES
NO: Looks OK.
Increase the "595: RX error limit value" to some extent.
Change the "718: Receive speed select" to 12000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the "596: Transmit level set".
Which mode?
FAX mode
TEL mode
TAD/FAX mode
NO
Is the FAX ring count (#06) 2, 3 or 4?
YES
Change the FAX ring count to 1.
Can not RX from Ricoh machines which have the G1,G2 and G3 modes.
YES
NO
Ask the sender to change:
• Send manually with the "☆" button.
Increase the "593: Time between CED & 300 bps" to some value.
Error code No. 68 (Echo)?
NO
YES
Decrease the "596:Transmit level set" from -10 dBm to -12 dBm or some value.
Change the "718:Receive speed select" to 14400, 12000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the TX level.
• Change the TX equalizer.

Note:

"596: Transmit level set" represents a service code. (Refer to SERVICE FUNCTION TABLE().)

Remarks:

Regarding the reception problem, we have investigated the conceivable causes in the flow chart except for the software-related errors. However, some troubles may occur due to the software-related problems such as "OUT OF PAPER" when the fax switches to the memory receiving mode and the memory capacity becomes full of the unprintable data. In this case, error messages [MEMORY FULL] and its main cause, for example "CHECK PAPER" are displayed on the LCD. Once you solve the main problem, [MEMORY FULL] will be cancelled and the reception problem will be resolved.

LCD display messages indicating the error causes are shown below.

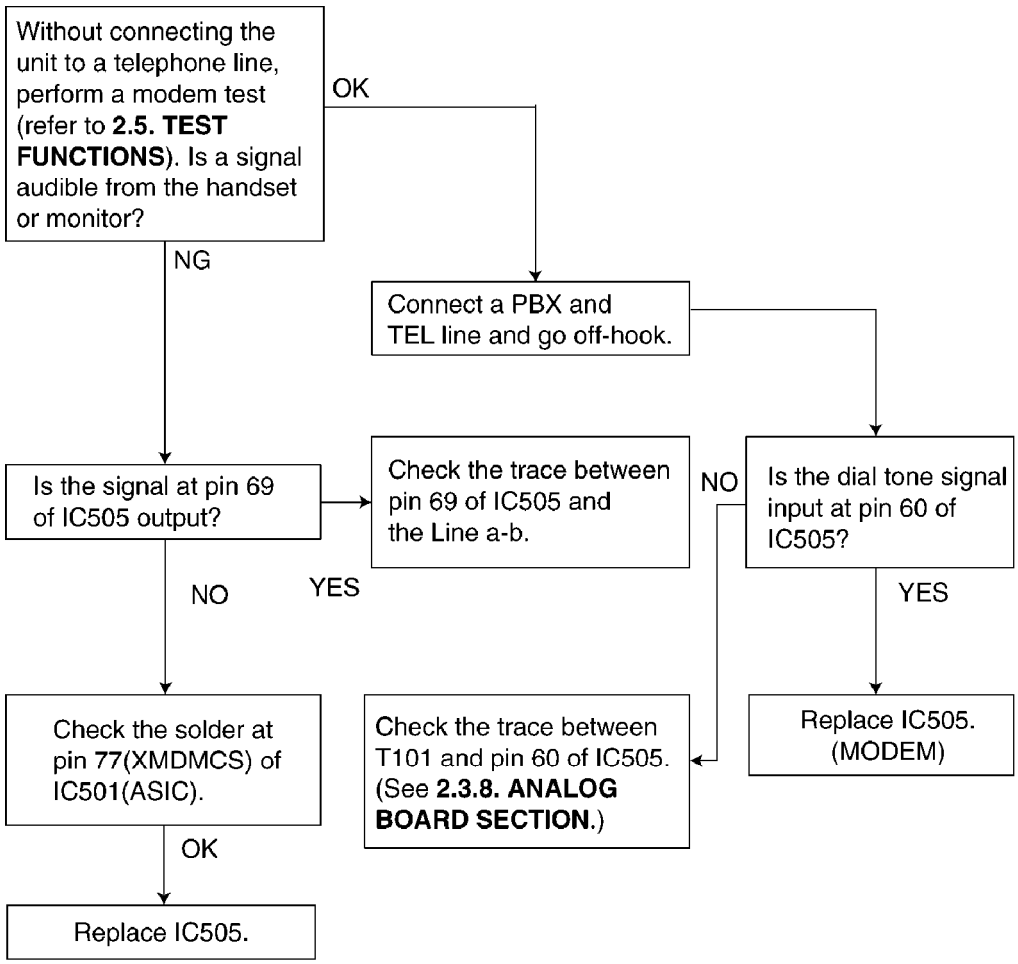
Refer to LCD MESSAGES (for KX-FM189S)().

CHECK PAPER

COVER OPEN

UNIT OVERHEATED (COVER OPEN, etc.)...Reset the unit.
PAPER JAMMED
CHECK FILM
Please refer to USER RECOVERABLE ERRORS () for the above items. If it turns out to be a hardware deformity, please check each sensor. (Refer to TEST FUNCTIONS ().)

2.3.5.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE


Without connecting the unit to a telephone line, perform a modem test (refer to 2.5. TEST FUNCTIONS). Is a signal audible from the handset or monitor?
OK
NG
Connect a PBX and TEL line and go off-hook.
Is the signal at pin 69 of IC505 output?
Check the trace between pin 69 of IC505 and the Line a-b.
NO
Is the dial tone signal input at pin 60 of IC505?
YES
NO
YES
Check the solder at pin 77(XMDMCS) of IC501(ASIC).
Check the trace between T101 and pin 60 of IC505. (See 2.3.8. ANALOG BOARD SECTION.)
Replace IC505. (MODEM)
OK
Replace IC505.

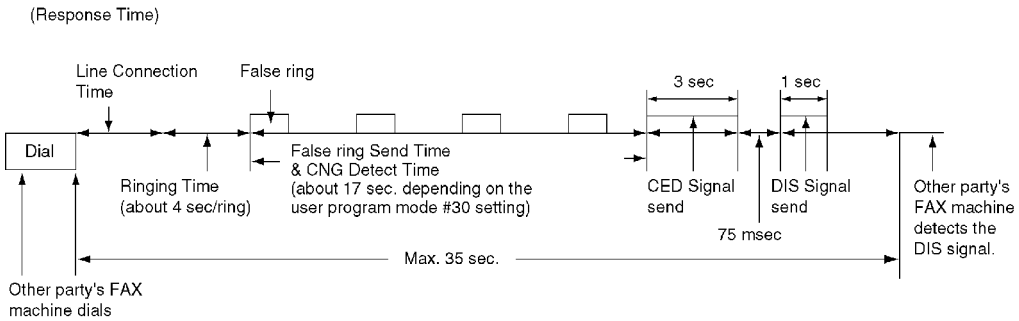
CROSS REFERENCE:
ANALOG BOARD SECTION()
TEST FUNCTIONS()

2.3.5.1.5. THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONL COMMUNICATIONS

The following two causes can be considered for this symptom.

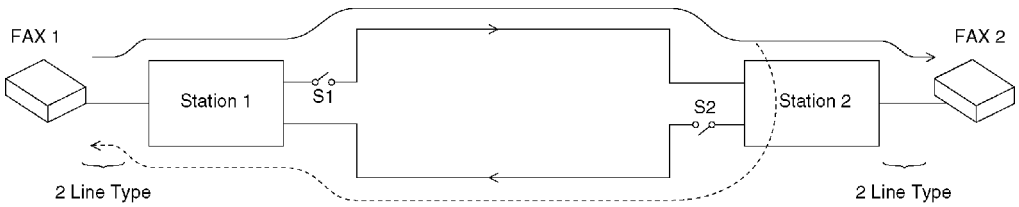
Cause 1:
The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and

can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is cancelled when there is no response from the other party within 35 sec, so that the other party releases the line.)



(Cause and Countermeasure)
As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.
(A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:
Erroneous detection because of an echo or an echo canceler.



(Echo/Echo Canceler)
The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.
(Causes and Countermeasures)
(Cause A)
When a training signal is transmitted from FAX1 during the communication procedure at the time of transmission from FAX1 to FAX2, there is a delay until the echo canceler operates. S1 is closed

so that a part of the head of the training signal may drop out. Normal reception by FAX2 may not be possible, and transmission may not be started.
(Countermeasure A)
When the international line mode is ON in the service mode (code No. 521), a dummy signal is attached to the head of the training signal to prevent this problem. As this is normally ON, it is necessary to reconfirm that this has not become OFF. When the international mode is switched OFF, the transmission side will try the training signal three times at each speed (9600BPS, 4800BPS and 2400BPS). If NG, it will drop the speed by one rank (fall-back). When the international mode is switched ON, each speed will be tried only twice. In other words, the slower speed with fewer errors can be accessed more easily. This is done because the line conditions may deteriorate and the picture may be disturbed more easily during communication for international lines or long distance communication, even when the training is OK. The default value is ON as preference is given to clearer pictures rather than speed.
(Cause B)
The echo canceler operation stops with a 2100Hz signal. (i.e. S1 and S2 become ON). Accordingly, when FAX1 has executed automatic reception, a CED signal is output. If this signal is 2100Hz, S1 and S2 will become ON. Then the echo of the DIS signal output afterwards may be received and FAX1 may execute an erroneous operation, preventing communication from starting.
(Countermeasure B)
In the service mode, the CED signal frequency is set to 1100 Hz (code No.520), or the time setting between the CED signal and the DIS signal is set from 75 msec to 500 msec in the service mode (code No.593). This is because the echo canceler operation stop mode is canceled by an interval of 250 msec or more. / Reduce receiving sensitivity to reduce the effect of RCV echo signal. (Service mode: code No. 598)

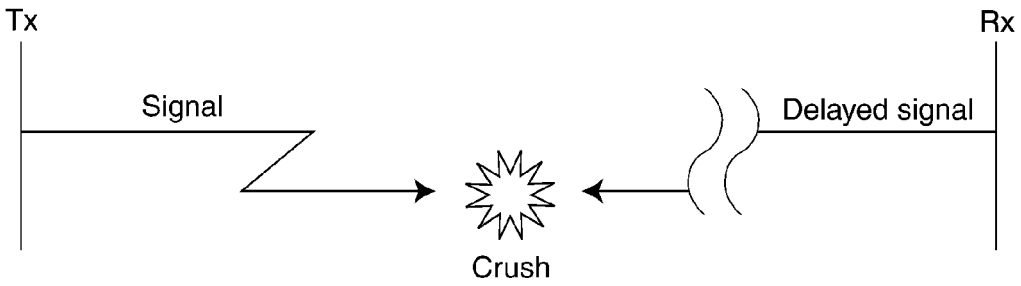
(Cause C)
This model is FAX1 and the other party is FAX2.
For transmission from this model to FAX2, FAX2 executes automatic reception and transmits a CED signal (2100 Hz) followed by a DIS signal. As the echo cancelers stops as described in cause B, the echo of the DIS signal returns to FAX2. On the other hand, this model detects the DIS signal and transmits a DCS signal. In other words, it is possible that the echo of the DIS signal and the DCS signal transmitted from this model reach FAX2 one after the other. FAX2 detects an error and communication does not start.
(Countermeasure C)
When the international DIS detection setting is set in the service mode (code No.594), this model does not respond to the first DIS signal and returns a DCS signal only for the second DIS signal. In other words, there is an interval of 250 msec between transmission of the first and second DIS signal so that the echo cancelers operation recovers. An echo is not generated for the second DIS signal.

Note:
When the other FAX does not respond with a DCS signal after DIS signal transmission, the DIS signal is transmitted until T1 Timer expierd..

(Cause D)

There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal.
(Countermeasure D)
Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both end.

<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side



Summary:
Symptom/Countermeasure Table (Long distance and international communication operations)

SYMPTOM	COUNTERMEASURE
Does not receive in the automatic mode.	1. If possible, manual transmission should be done from the transmission side. 2. If possible, two pauses should be inserted at the end of the auto dial number on the transmission side. 3. If possible, the Function Selector Switch should be switched to FAX.
Does not transmit.	1. Confirm the international line mode is ON. (Service mode: code No. 521) 2. Set the international DIS detection. (Service mode: code No. 594) 3. Set proper time as T4 Interval (Service mode: code No. 774)
Does not receive.	1. Set the time setting between the CED signal and the DIS signal to 500 msec. (Service mode: code No. 593) 2. Set the CED frequency to 1100Hz. (Service mode: code No. 520) 3. Reduce the RCV sensitivity. (Service mode: code No. 598) 4. Set proper time as T4 Interval (Service mode: code No. 774)

2.3.5.1.6. THE UNIT CAN COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT

(Long distance or international communication operation)
This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.
The countermeasures for this unit are shown below.

Transmission Operation:
Set the transmitting speed to 12000BPS (service mode: code No. 717) or select the overseas

mode.

Reception Operation:
If 80% or more of the reception is incorrect, set the receiving speed to 12000BPS. (Service mode: code No. 718)

- Refer to SERVICE FUNCTION TABLE().

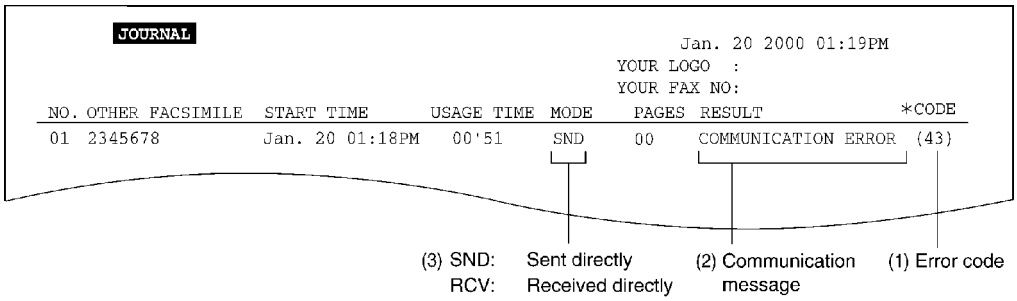
2.3.5.1.7. HOW TO OUTPUT THE JOURNAL REPORT

1. Press the “MEMU“button 2 times.

2. Rotate EASY DIAL until the “ Journal ” is displayed.

3. Press the “SET“ button.

4. The report prints out.


JOURNAL
Jan. 20 2000 01:19PM
YOUR LOGO :
YOUR FAX NO:
NO. OTHER FACSIMILE START TIME USAGE TIME MODE PAGES RESULT *CODE
01 2345678 Jan. 20 01:18PM 00'51 SND 00 COMMUNICATION ERROR (43)
(3) SND: Sent directly
RCV: Received directly
(2) Communication message
(1) Error code

Error code table: Refer to ERROR CODE TABLE (for KX-FM189S)().

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Cou mea
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	THE COVER WAS OPENED	SND & RCV	The cover is open.	
40	NO RESPONSE	SND	Transmission is finished when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.	

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Cou mea
48	COMMUNICATION ERROR	RCV	No post message.	
49	COMMUNICATION ERROR	RCV	RTN is transmitted.	
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).	
51	COMMUNICATION ERROR	RCV	PIN is transmitted.	
52	NO RESPONSE	RCV	Reception is finished when the T1 TIMER expires.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.	
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.	
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.	
75	MEMORY FULL	RCV	The document was not received due to memory full.	
79	CANCELED	SND	The multi-station transmission was rejected by the user.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to MODEM SECTION ().	

SND=TRANSMISSION RCV=RECEPTION

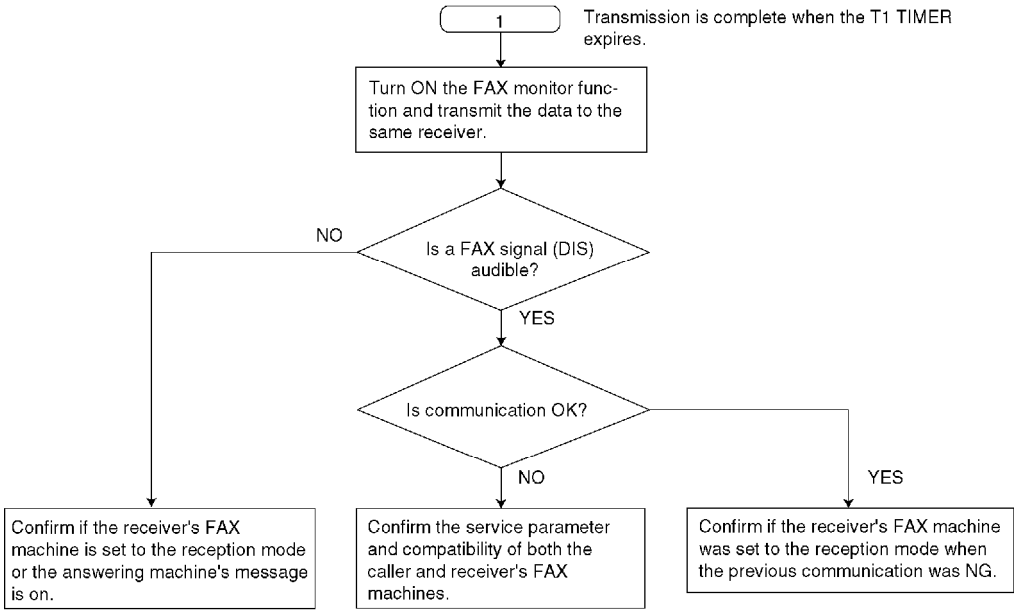
Most fax communication problems can be resolved by the following steps.

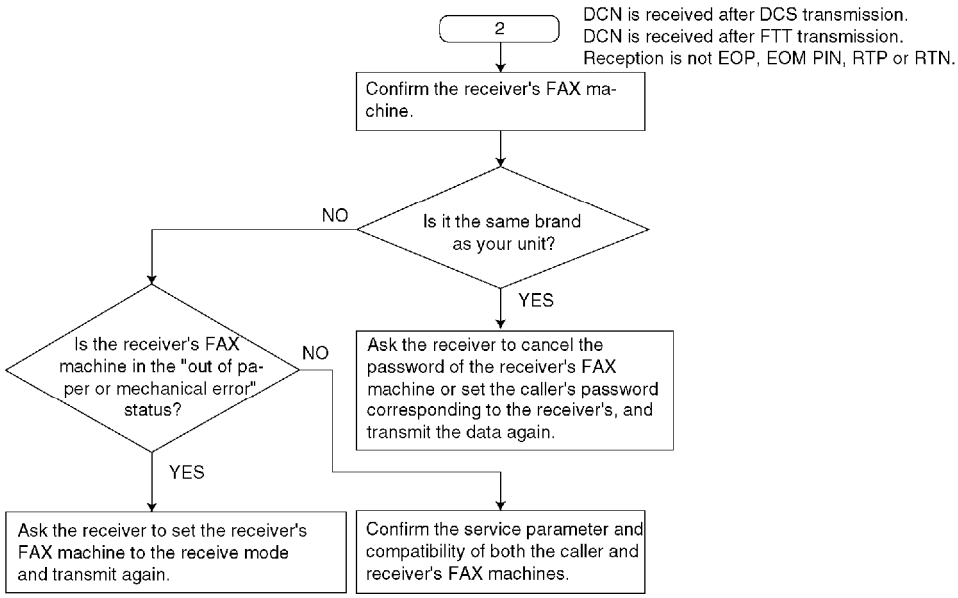
1. **Change the transmit level. (Service code: 596, refer to SERVICE FUNCTION TABLE().)**
2. **Change the TX speed/RX speed. (Service code: 717/718, refer to SERVICE FUNCTION TABLE ().)**

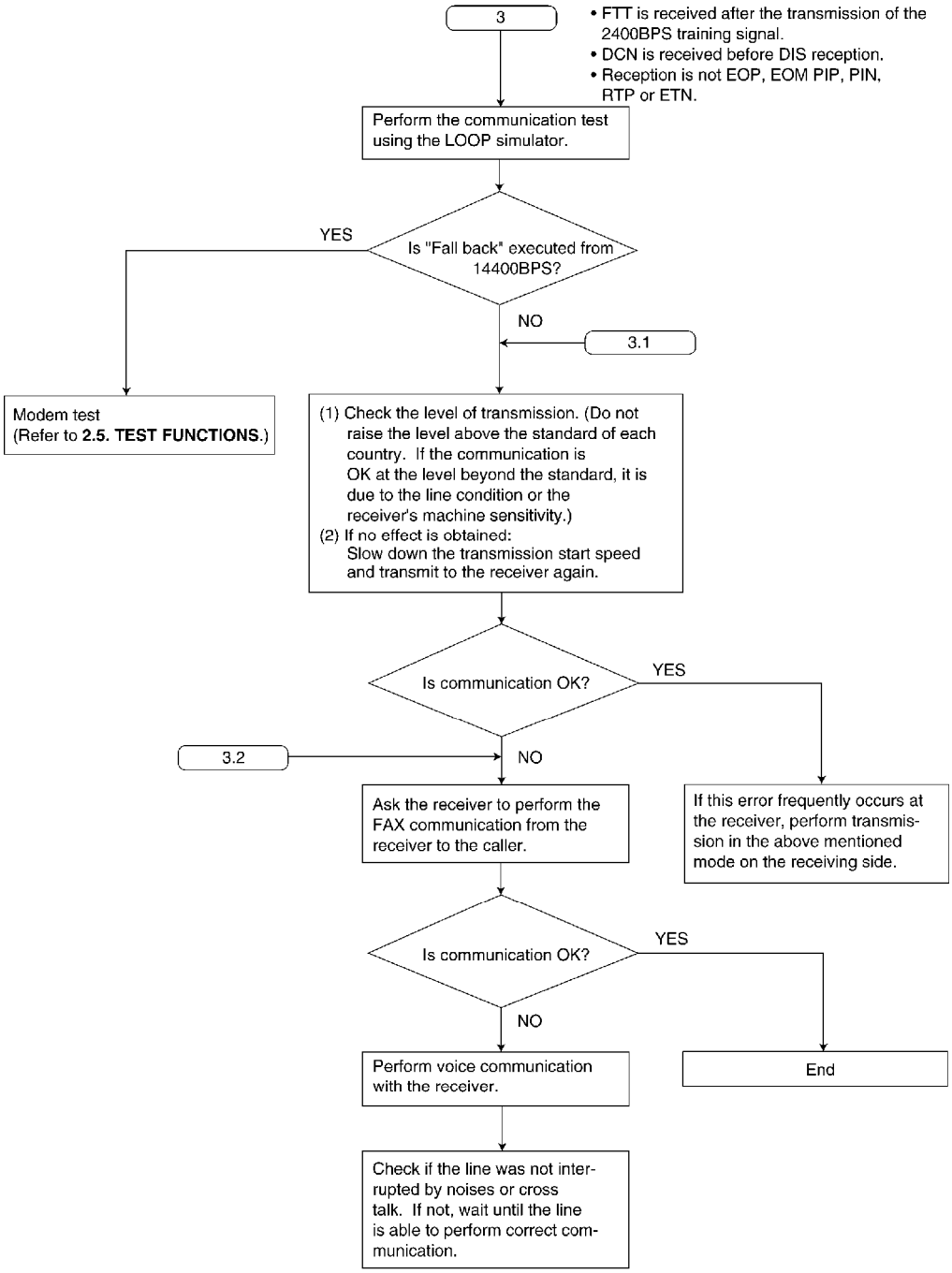
Note*:

If the problem remains, see the following "Countermeasure" flow chart.

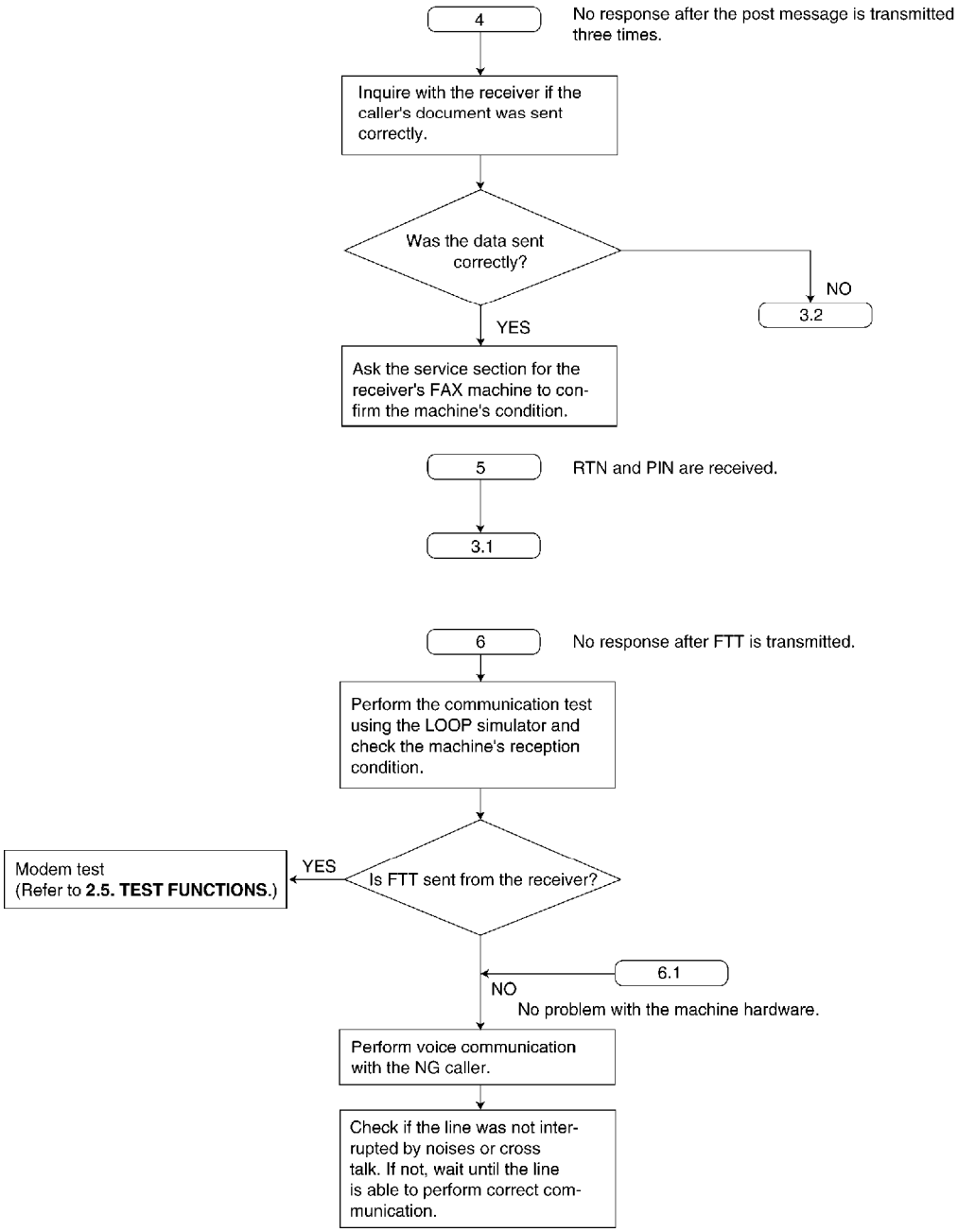
Countermeasure


1
Transmission is complete when the T1 TIMER expires.
Turn ON the FAX monitor function and transmit the data to the same receiver.
Is a FAX signal (DIS) audible?
NO
YES
Is communication OK?
NO
YES
Confirm if the receiver's FAX machine is set to the reception mode or the answering machine's message is on.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.
Confirm if the receiver's FAX machine was set to the reception mode when the previous communication was NG.

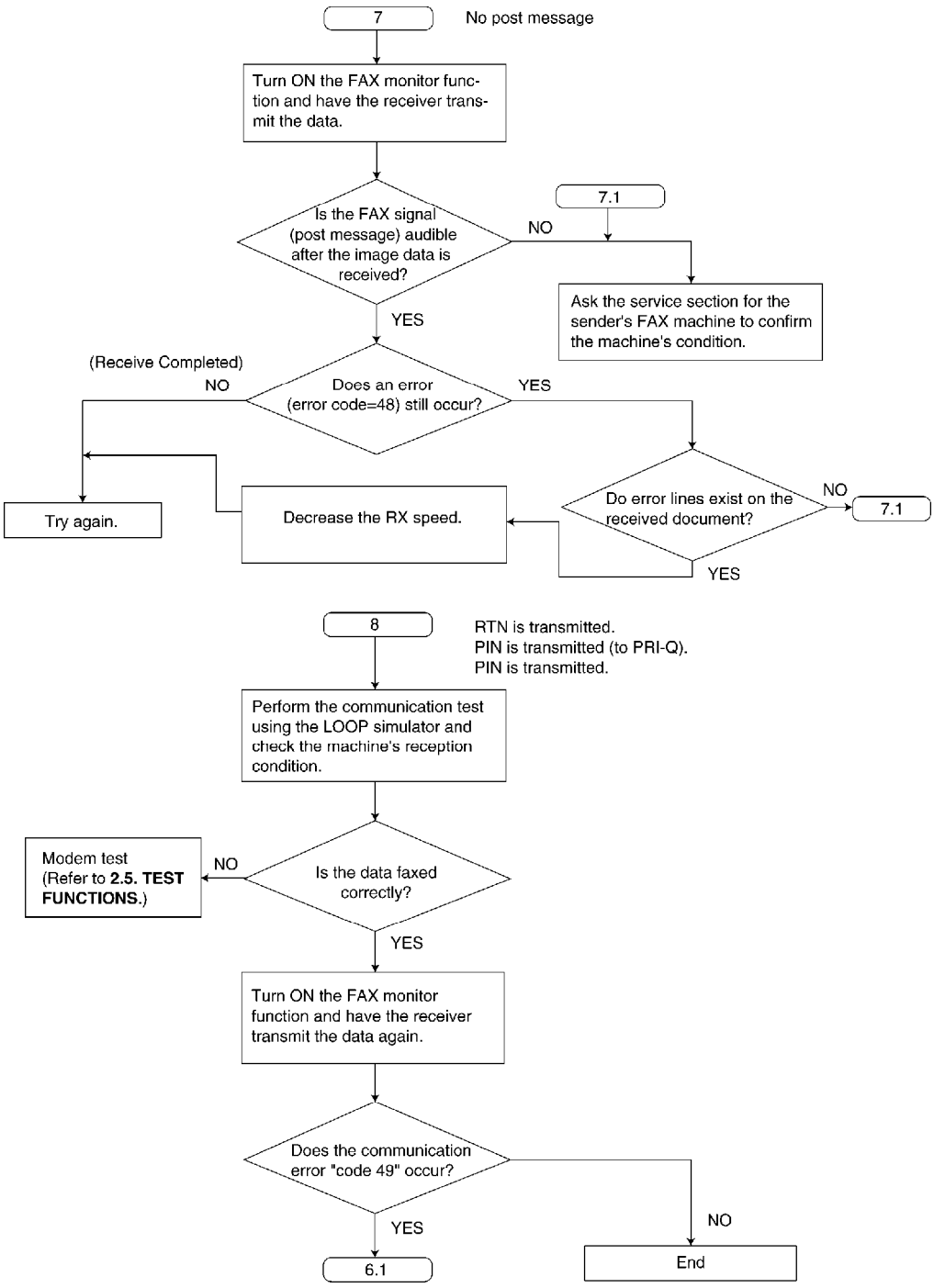

2
DCN is received after DCS transmission.
DCN is received after FTT transmission.
Reception is not EOP, EOM PIN, RTP or RTN.
Confirm the receiver's FAX machine.
Is it the same brand as your unit?
NO
YES
Is the receiver's FAX machine in the "out of paper or mechanical error" status?
NO
YES
Ask the receiver to cancel the password of the receiver's FAX machine or set the caller's password corresponding to the receiver's, and transmit the data again.
Ask the receiver to set the receiver's FAX machine to the receive mode and transmit again.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.


3
• FTT is received after the transmission of the 2400BPS training signal.
• DCN is received before DIS reception.
• Reception is not EOP, EOM PIP, PIN, RTP or ETN.
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 14400BPS?
YES
NO
3.1
Modem test
(Refer to 2.5. TEST FUNCTIONS.)
(1) Check the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
(2) If no effect is obtained:
Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
3.2
NO
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

CROSS REFERENCE:
TEST FUNCTIONS()

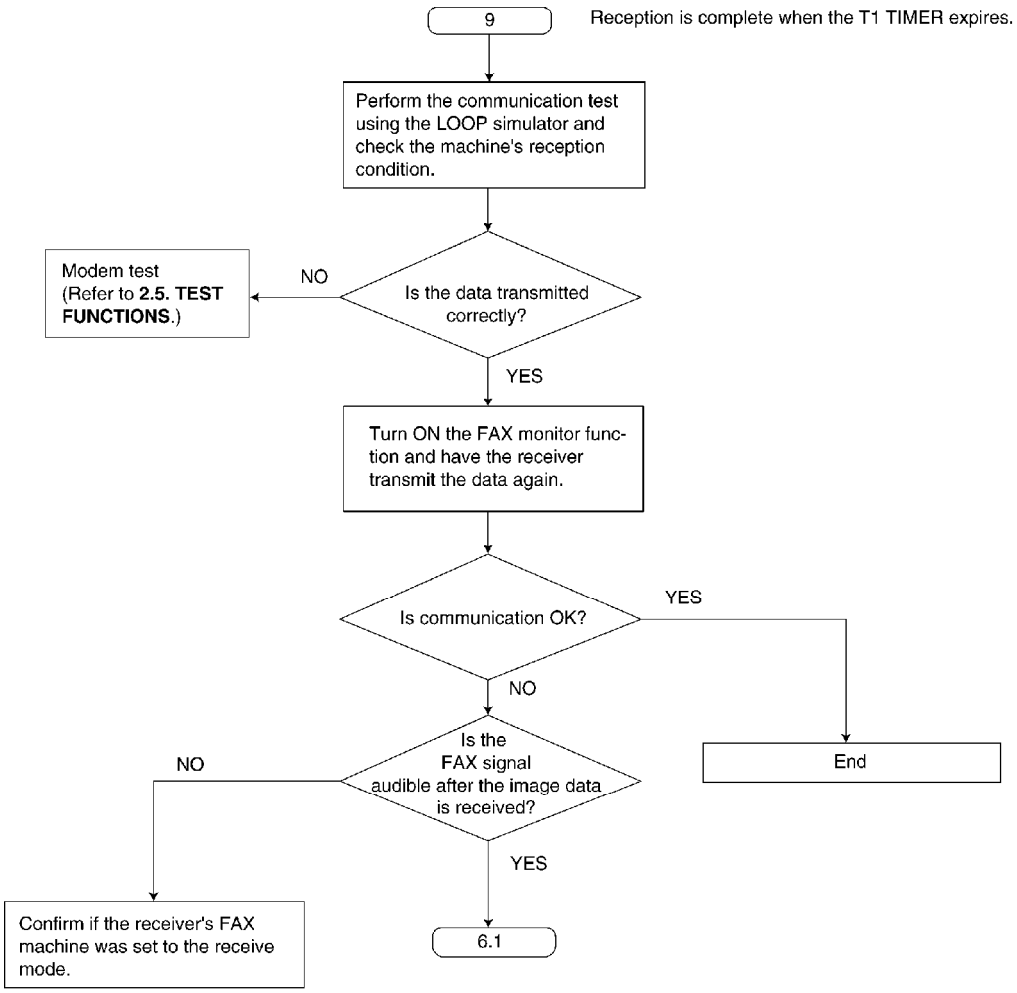

4
No response after the post message is transmitted three times.
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.
5
RTN and PIN are received.
3.1
6
No response after FTT is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test
(Refer to 2.5. TEST FUNCTIONS.)
YES
Is FTT sent from the receiver?
6.1
NO
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

CROSS REFERENCE:
TEST FUNCTIONS()

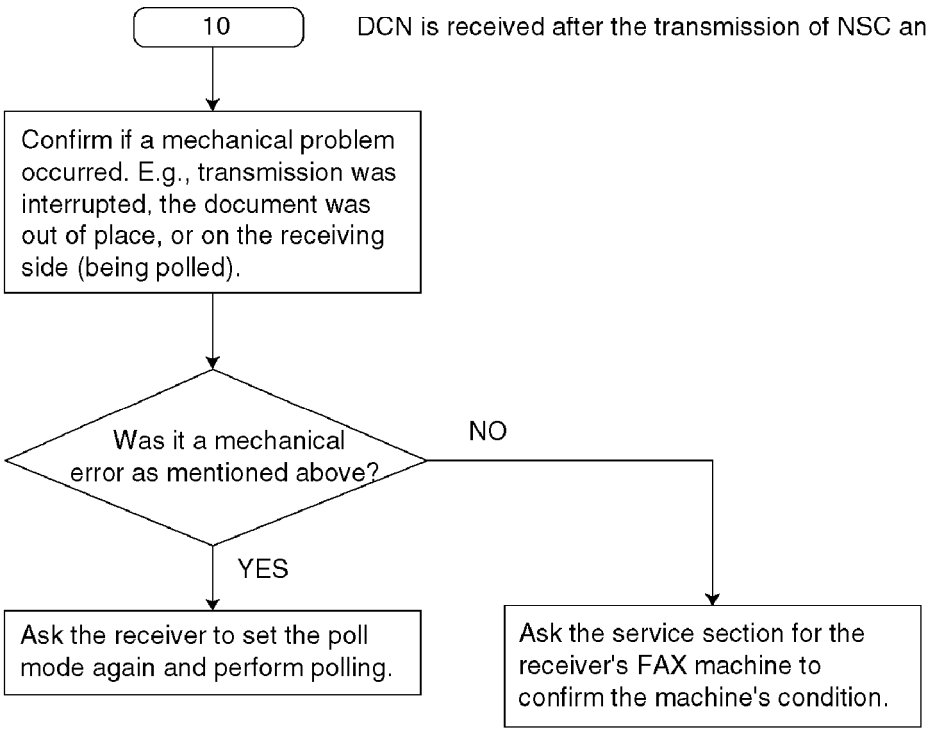

7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) audible after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Try again.
Decrease the RX speed.
Do error lines exist on the received document?
NO
7.1
YES
8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test
(Refer to 2.5. TEST FUNCTIONS.)
NO
Is the data faxed correctly?
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
6.1
NO
End

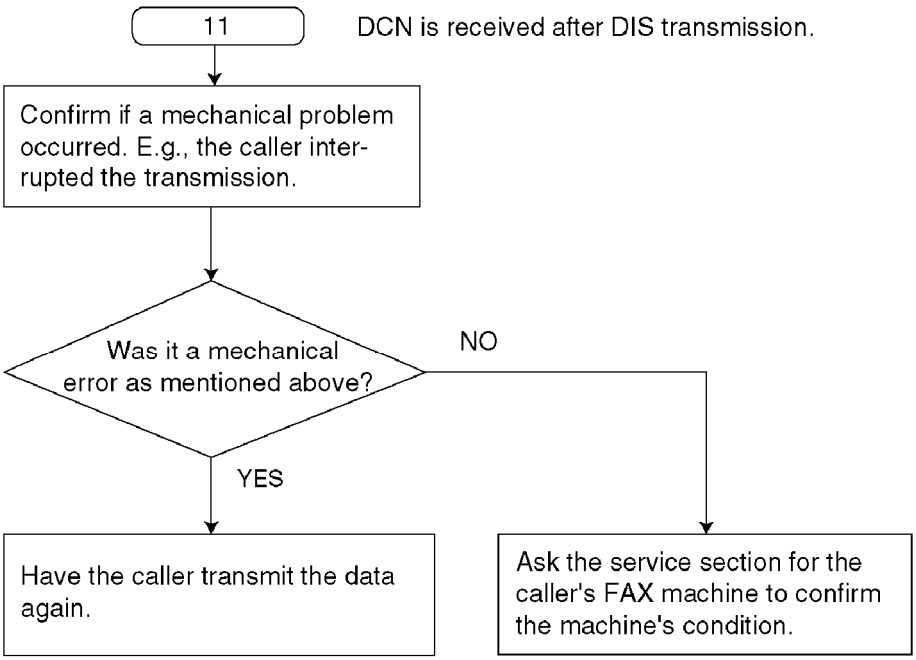
CROSS REFERENCE:

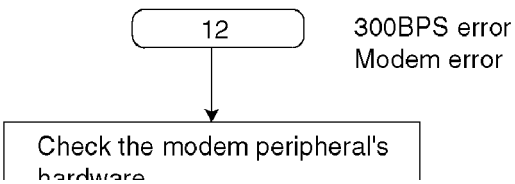
TEST FUNCTIONS()


9
Reception is complete when the T1 TIMER expires.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to 2.5. TEST FUNCTIONS.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal audible after the image data is received?
NO
YES
Confirm if the receiver's FAX machine was set to the receive mode.
6.1

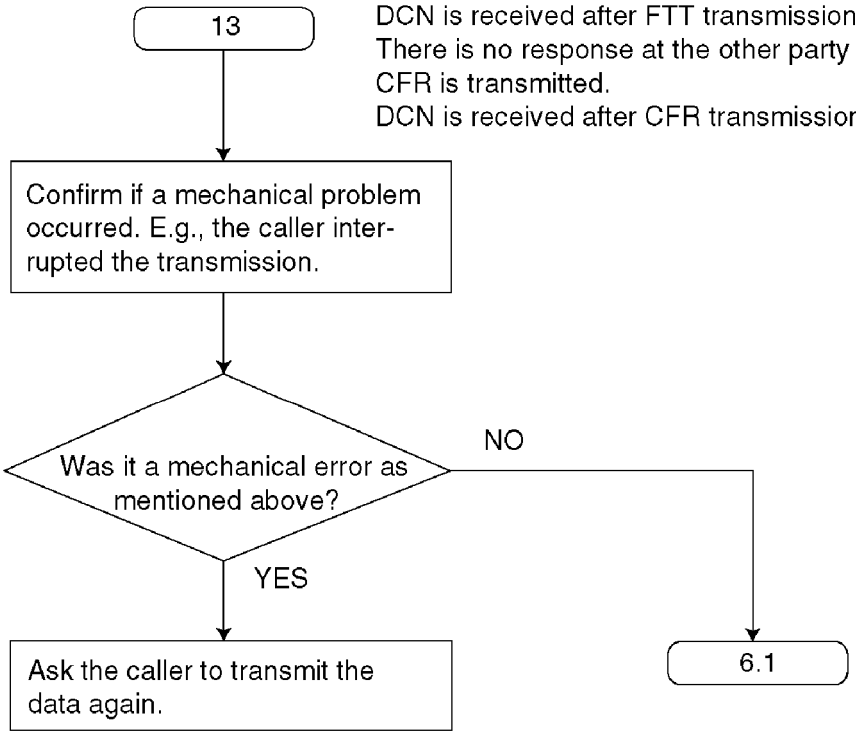
CROSS REFERENCE:
TEST FUNCTIONS()

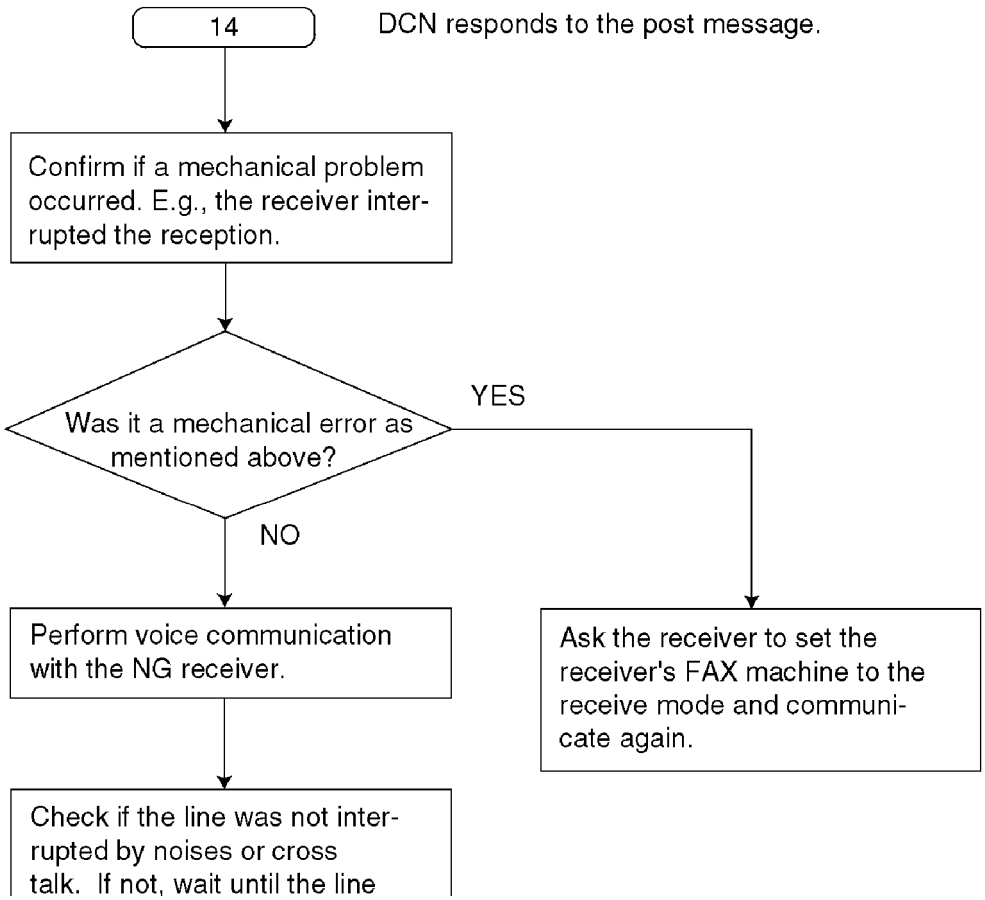

10
DCN is received after the transmission of NSC and DTC.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

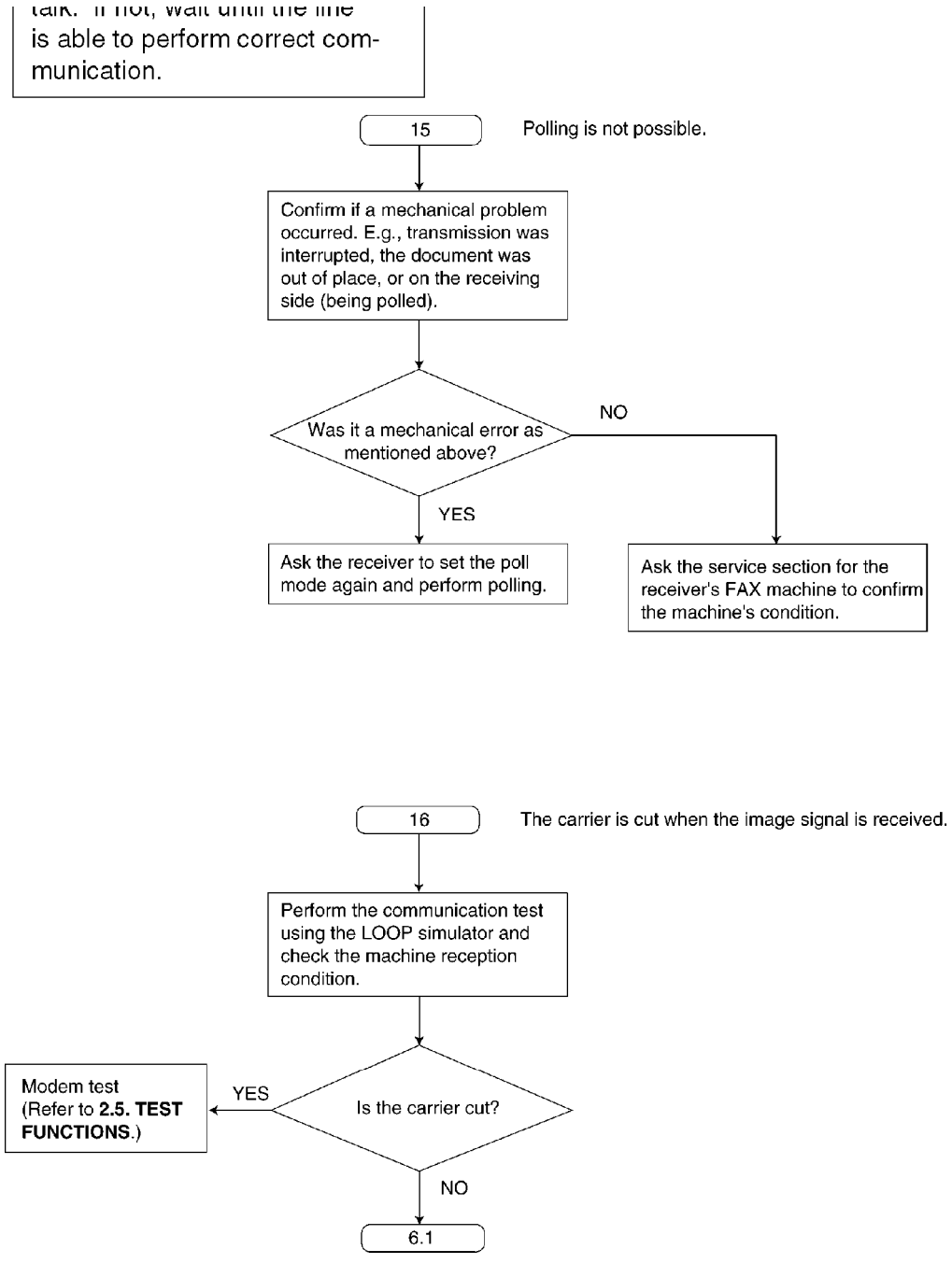

11
DCN is received after DIS transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.


12
300BPS error
Modem error
Check the modem peripheral's hardware

hardware.


13
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1


14
DCN responds to the post message.
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line


talk. If not, wait until the line is able to perform correct communication.
15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.
16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Modem test (Refer to 2.5. TEST FUNCTIONS.)
YES
Is the carrier cut?
NO
6.1

CROSS REFERENCE:
TEST FUNCTIONS()

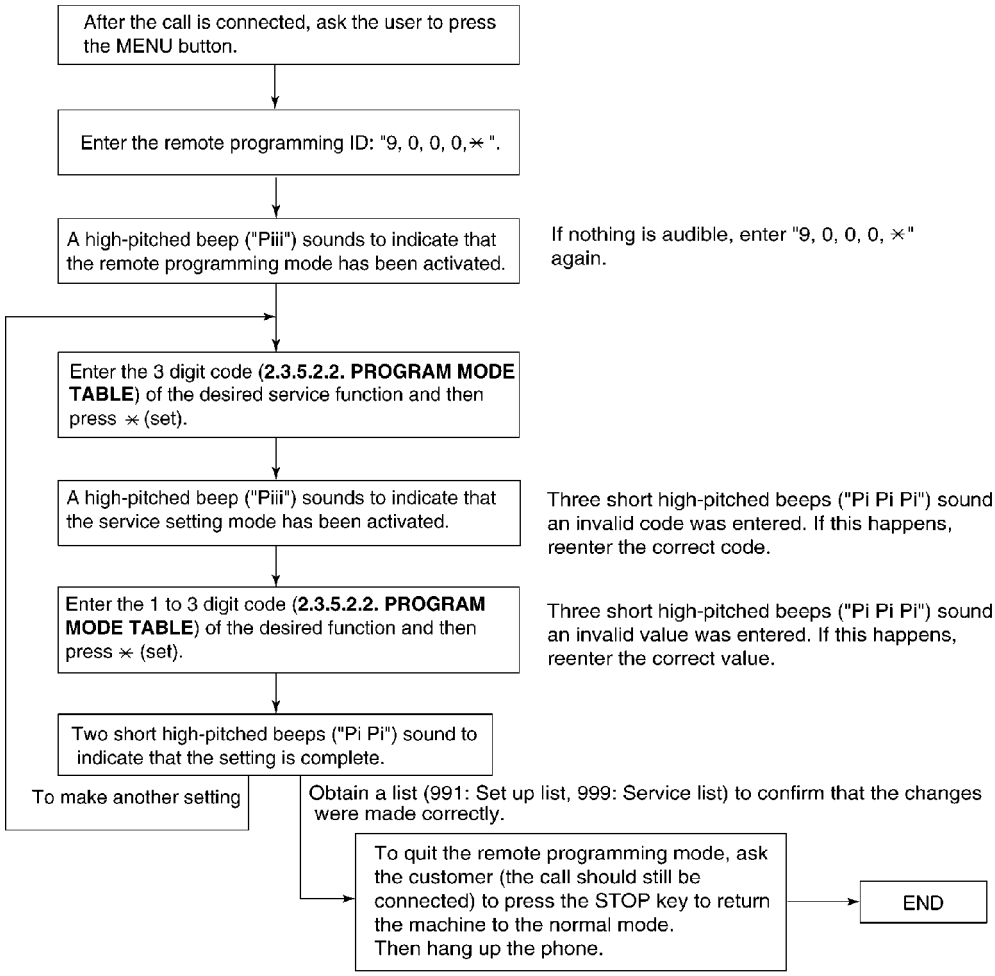
2.3.5.2. REMOTE PROGRAMMING

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (PROGRAM MODE TABLE ()). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer's fax machine.
Based on this, the parameters for the desired codes can be changed.
The procedure for changing and listing parameters is described on ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES(). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Hint:
Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

2.3.5.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES


After the call is connected, ask the user to press the MENU button.
Enter the remote programming ID: "9, 0, 0, 0, ✳".
A high-pitched beep ("Piii") sounds to indicate that the remote programming mode has been activated.
If nothing is audible, enter "9, 0, 0, 0, ✳" again.
Enter the 3 digit code (2.3.5.2.2. PROGRAM MODE TABLE) of the desired service function and then press ✳ (set).
A high-pitched beep ("Piii") sounds to indicate that the service setting mode has been activated.
Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid code was entered. If this happens, reenter the correct code.
Enter the 1 to 3 digit code (2.3.5.2.2. PROGRAM MODE TABLE) of the desired function and then press ✳ (set).
Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid value was entered. If this happens, reenter the correct value.
Two short high-pitched beeps ("Pi Pi") sound to indicate that the setting is complete.
To make another setting
Obtain a list (991: Set up list, 999: Service list) to confirm that the changes were made correctly.
To quit the remote programming mode, ask the customer (the call should still be connected) to press the STOP key to return the machine to the normal mode. Then hang up the phone.
END

CROSS REFERENCE:
PROGRAM MODE TABLE()

2.3.5.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	dd/mm/yy hh:mm	01/Jan/00	NG
002	Your logo	---------	None	NG
003	Your fax number	---------	None	NG
004	Transmission report mode	1:ERROR / 2:ON / 3:OFF	ERROR	OK
006	TAD/FAX ring count	1~4/TOLL SAVER / RINGER OFF	2	OK
010	Recording time	1:VOX, 2:1~9 MIN	VOX	OK
011	Remote TAD ID	ON / OFF	ON ID=111	NG
014	PC LINK	1:ON / 2:OFF	ON	OK
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	1:ON / 2:OFF	OFF	OK
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto caller ID list	1:ON / 2:OFF	ON	OK
030	Silent FAX recognition ring	3 to 9 rings	3	OK
036	Rx reduction	1:72% / 2:86% / 3:92% / 4: 100%	92%	OK
039	LCD contrast	NORMAL / DARKER	NORMAL	NG
041	Remote FAX activation code	ON / OFF	ON ID=*9	NG
042	Message alert	1:ON / 2:OFF	OFF	OK
043	REC. time alert	1:ON / 2:OFF	OFF	OK
044	Receive alert	1:ON / 2:OFF	ON	OK
046	Friendly receive	1:ON / 2:OFF	ON	OK
047	Voice guidance (for KX-FM189S)	1:ON / 2:OFF	ON	OK
048	Language (KX-FM189S only)	1:ENGLISH / 2:SWEDISH	SWEDISH	OK
054	Common greeting MSG. REC. time	1:16s / 2:60s	16s	OK
060	Message transfer	ON / OFF	OFF	NG
061	Transfer greeting	CHECK / RECORD / EARSE	CHECK	NG
067	ICM monitor	1:ON / 2:OFF	ON	OK
068	ECM selection	1:ON / 2:OFF	ON	OK
070	Pager call	ON / OFF	OFF	NG
071	Melody ringer	A / B / C	A	NG
076	Connecting tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1:TAD/FAX, 2:FAX only , 3: TEL/FAX	TAD/FAX	OK
078	TEL/FAX ring	1 to 9 rings	2	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	030	OK
502	Flash time set (for KX-FM189BL)	01~99 x 10msec	12	OK
502	Flash time set (for KX-FM189S)	01~99 x 10msec	09	OK
510	Vox time	1:8sec / 2:6sec / 3:4sec	6sec	OK
511	Vox sense	1:High / 2:Low	High	OK

Code	Function	Set Value	Default	Remote Setting
512	Vox mode	1:ON / 2:OFF	ON	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
524	Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
533	Message transger auto redial time set	00~99	03	OK
534	Message transger auto redial time line disconnection time set	005~999	065	OK
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scanner test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
559	Document jam detection	1:ON / 2:OFF	ON	OK
561	Key test	---------	---------	NG
571	ITS auto redial time set	00~14	05	OK
572	ITS auto redial line disconnection time set	005~999sec	065	OK
573	Remote turn-on ring number	01~99	10	OK
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~14	05	OK
591	FAX auto redial line disconnection time set	005~999sec	065	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	OK
595	Receive error limit value	1:5% / 2:10% / 3:15% / 4: 20%	10%	OK
596	Transmit level set	-15~00dBm	09	OK
598	Receiving Sensitivity	20~48	39	OK
599	ECM Frame size	1:256/ 2:64	256byte	OK
624	AT ring time out	1:3sec / 2:5sec	3sec	OK
711	Dialing mode	1:PULSE / 2:TONE	TONE	OK
717	Transmit speed select	1:14400/2:12000/3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	1:14400/2:12000/3:9600/ 4: 7200/ 5:4800/ 6:2400	14400bps	OK
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK

Code	Function	Set Value	Default	Remote Setting
722	Redial tone detect	1:ON / 2:OFF	ON	OK
724	PC-FAX ATD busy tone detect	1:ON / 2:OFF	OFF	OK
731	CPC mode	1:ON / 2:OFF	ON	OK
732	Auto disconnect cancel time	1:350ms / 2:1800ms / 3:OFF	350ms	OK
745	Power on film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
774	T4 timer	00~99 x 100ms	00	OK
775	Monitoring of message transfer	1:ON / 2:OFF	OFF	OK
815	Sensor & VOX test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~9	5	OK
854	Left margin	1~8	5	OK
861	A4 size set	1:ON / 2:OFF	ON	OK
880	History list	1:Start	---------	NG
881	Journal 2	1:Start	---------	NG
882	Journal 3	1:Start	---------	NG
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK
895	TEL/FAX Receive mode	1:TAD/FAX / 2:FAX	FAX	OK
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
995	Journal 2 list	1:Start	---------	OK
996	Journal 3 list	1:Start	---------	OK
998	History list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

OK means "can set".
NG means "can not set".

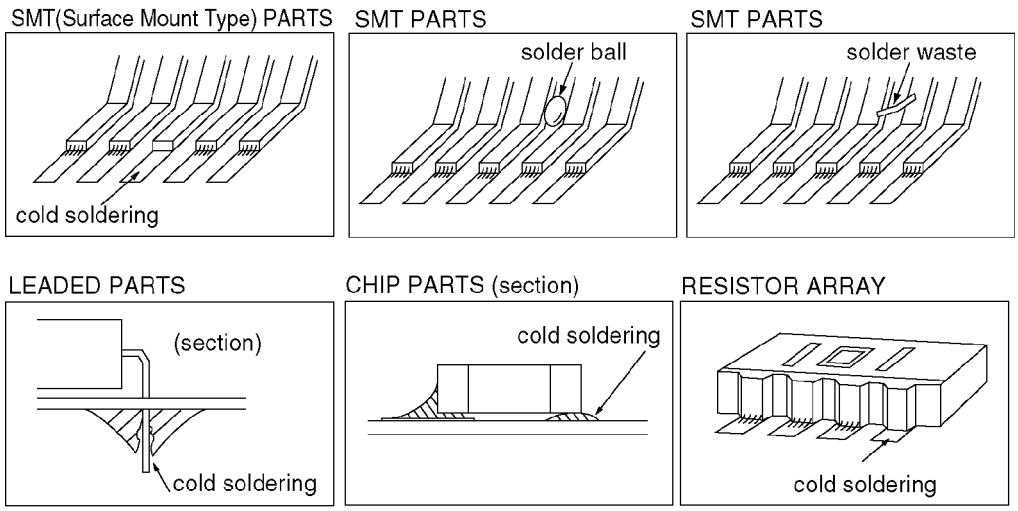
Note:
Refer to SERVICE FUNCTION TABLE () for descriptions of the individual codes.

Example:
If you want to set value in the "004 Transmission report mode", press the dial key number 1,2 or 3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

2.3.6. DIGITAL BOARD SECTION

When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)
The first step is to check the power source. If there is no problem with the power supply unit, the

problem may lie in the digital unit (main board).
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

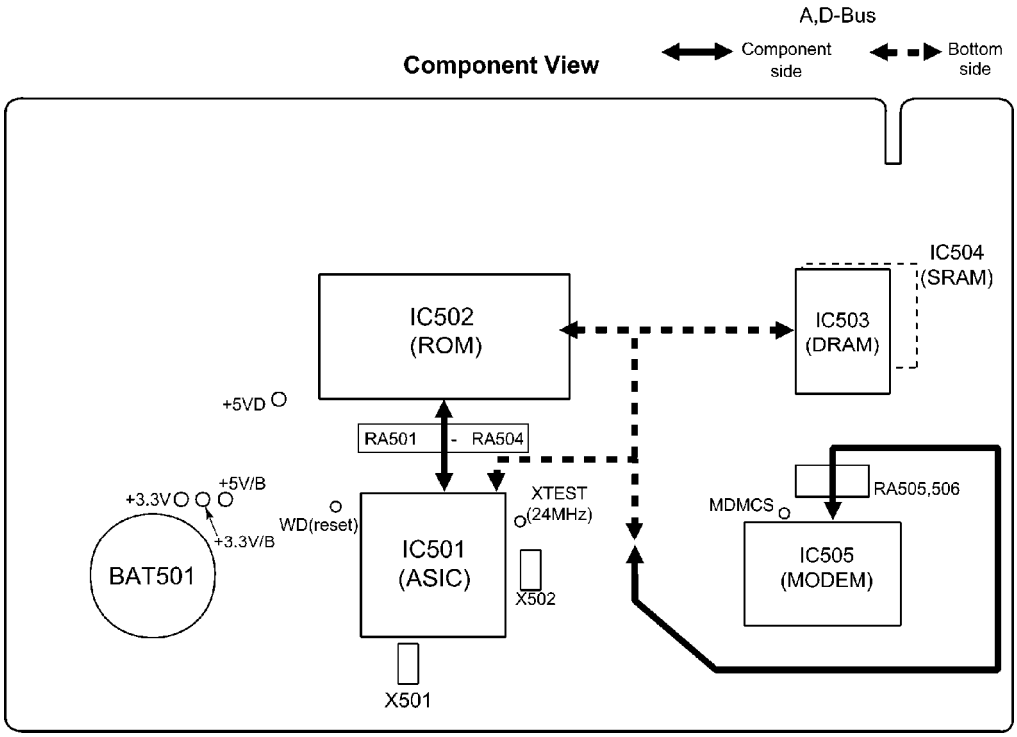
1. **Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.**
2. **Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.**

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM, DRAM and ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.

Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?
Please refer to DIGITAL BLOCK DIAGRAM ().
The ASIC (IC501) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC502), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address. It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs. These signal lines are all controlled by voltages of 5V (H) or 0V (L).

2.3.6.1. DIGITAL BLOCK DIAGRAM



/ / / /

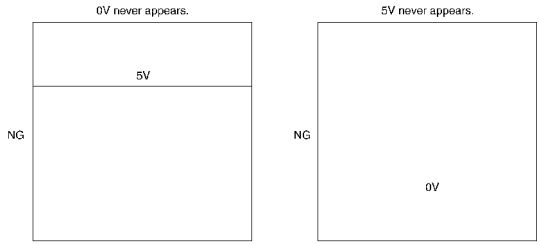
You also need to check the signal lines listed here [List 1] when the unit fails to boot up the system. Those signal lines should remain normal. Other signal lines are not directly related to that failure even if they have faults or troubles.

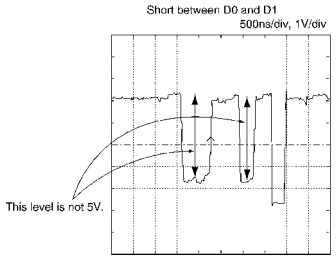
[List 1]

①	D0～D7	(Data Bus)
②	A0～A15	(Address Bus)
③	$\overline{RD}$	(Read Signal)
	$\overline{ROMCS}$	(ROM Select Signal)
	$\overline{WR}$	(Write Signal)
	$\overline{RAMCS}$	(SRAM Select Signal)
④	RBA0～RBA5	(Bank Address Signal)
⑤	$\overline{RAS}$	(DRAM Row Address Strobe Signal)
	$\overline{CAS}$	(DRAM Column Address Strobe Signal)
⑥	$\overline{MDMCS}$	(Modem Select Signal)

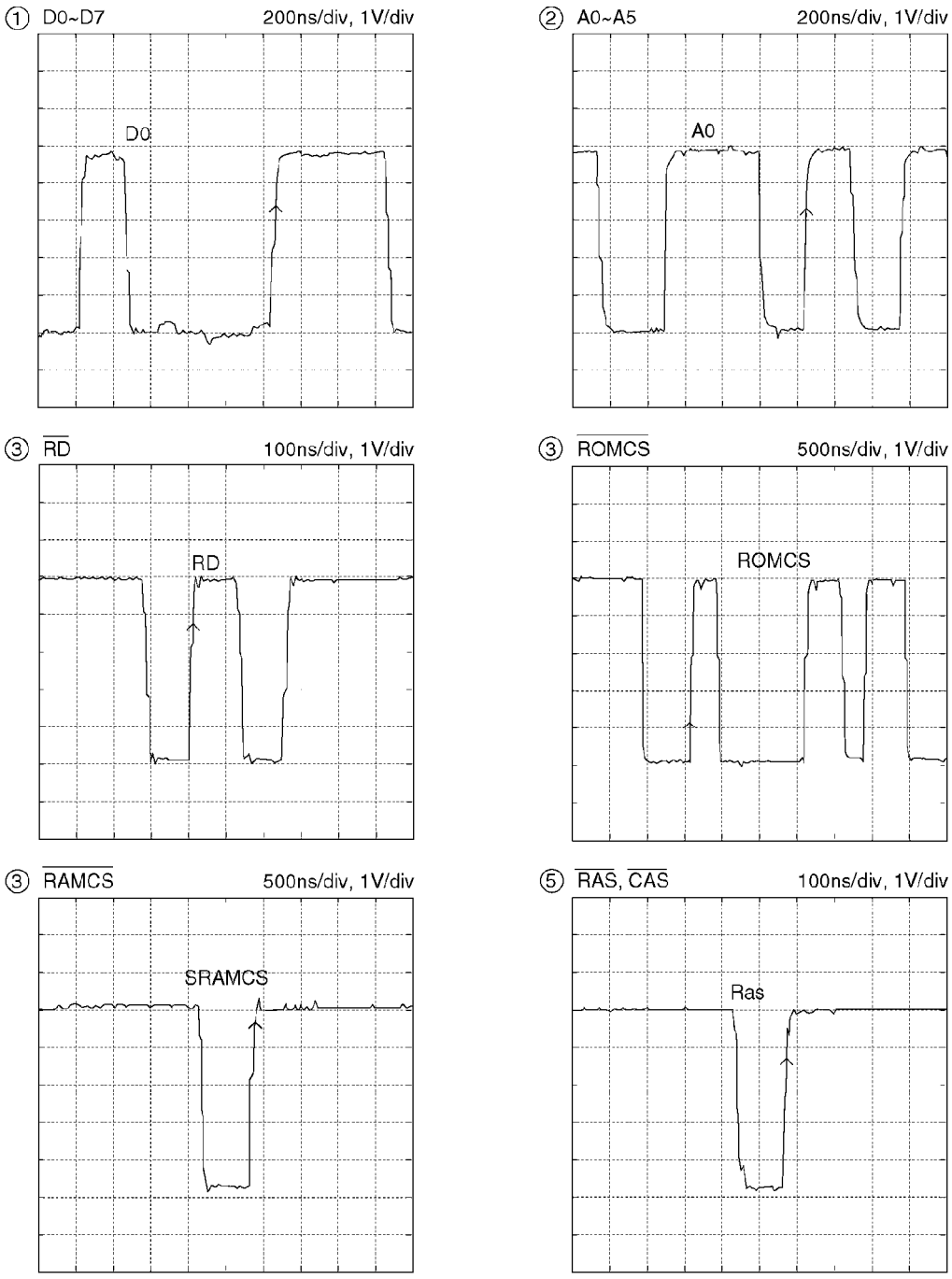
As long as these signals remain normal, once the power is turned on, each IC can repeatedly output 5V (H) and 0V (L). The following shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)





Normal Wave Patterns



Remarks:

When you use an oscilloscope to judge whether a signal to be tested is normal or NG, perform the signal check in exactly the same order as in [List 1]. (If the ASIC fails to access the ROM, the ASIC cannot access SRAM or DRAM normally.)

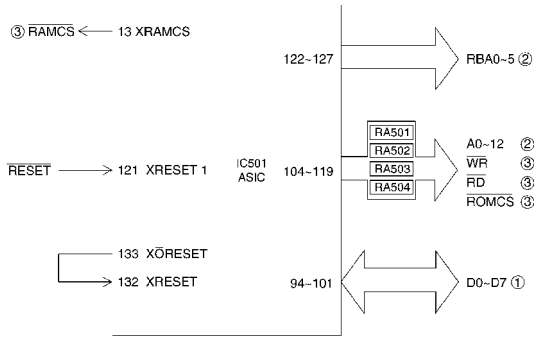
The digital circuit actually operates according to the timing combinations of these signals. If the timing of these signals is even slightly delayed, the circuit will not work. Nor will it if the IC is defective and the output voltage level is not normal although the timing of these signals is accurate enough to meet the specifications. (Make sure that your oscilloscope is calibrated before starting a test.)

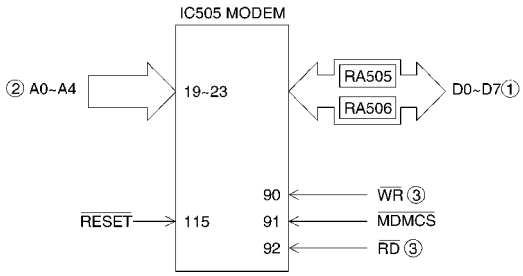
Therefore, it is imperative to confirm whether each IC outputs the signal at the correct level. (See

the I/O Pin No. Diagram.) The signal level should be constantly output at between 5V (H) and 0V (L) as described earlier.

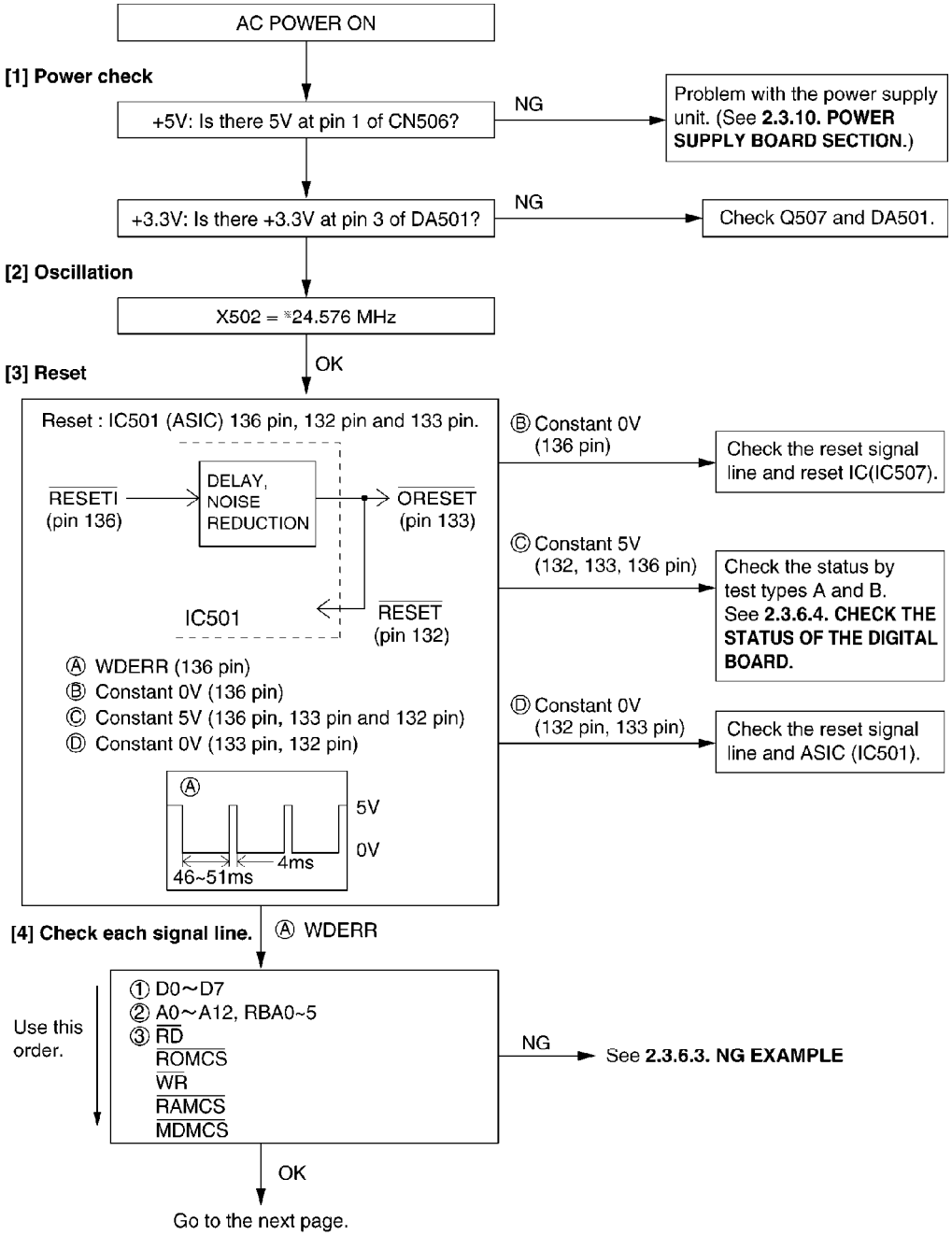
Note:
Simply check the output level and make sure if the IC repeatedly outputs the signal at between 5V (H) and 0V (L).

I/O and Pin No. Diagram





After the power is turned on, the ASIC initializes and checks each IC.
The ROM, SRAM, and modem are checked.
If initialization fails for the ICs , the system will not boot up.
In this case, please find the cause as follows.

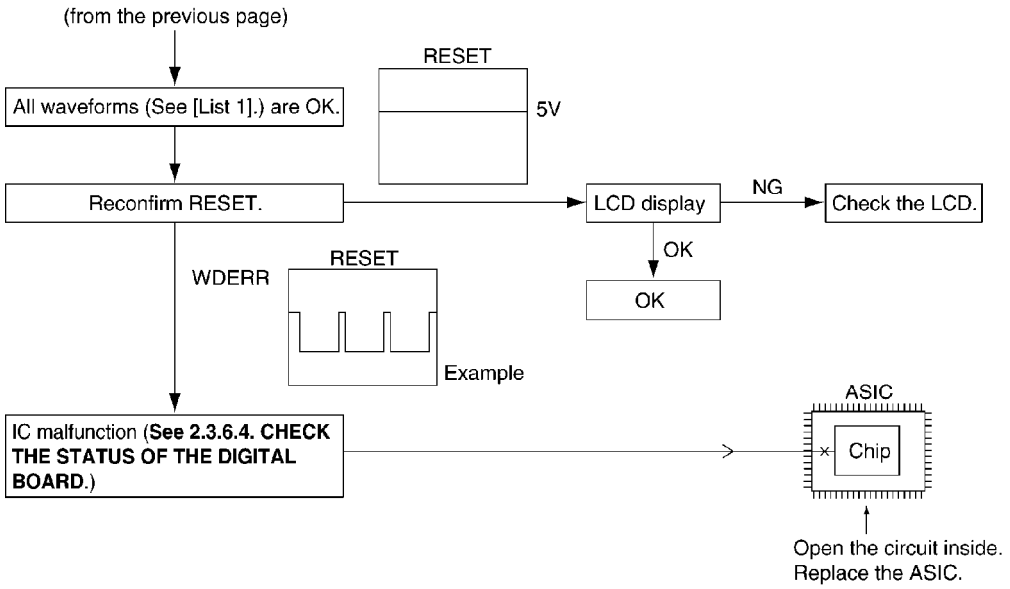

AC POWER ON
[1] Power check
+5V: Is there 5V at pin 1 of CN506?
NG
Problem with the power supply unit. (See 2.3.10. POWER SUPPLY BOARD SECTION.)
+3.3V: Is there +3.3V at pin 3 of DA501?
NG
Check Q507 and DA501.
[2] Oscillation
X502 = 24.576 MHz
[3] Reset
OK
Reset : IC501 (ASIC) 136 pin, 132 pin and 133 pin.
RESETI (pin 136)
DELAY, NOISE REDUCTION
ORESET (pin 133)
IC501
RESET (pin 132)
Ⓐ WDERR (136 pin)
Ⓑ Constant 0V (136 pin)
Ⓒ Constant 5V (136 pin, 133 pin and 132 pin)
Ⓓ Constant 0V (133 pin, 132 pin)
Ⓐ
5V
0V
4ms
46~51ms
Ⓑ Constant 0V (136 pin)
Check the reset signal line and reset IC(IC507).
Ⓒ Constant 5V (132, 133, 136 pin)
Check the status by test types A and B. See 2.3.6.4. CHECK THE STATUS OF THE DIGITAL BOARD.
Ⓓ Constant 0V (132 pin, 133 pin)
Check the reset signal line and ASIC (IC501).
[4] Check each signal line.
Ⓐ WDERR
Use this order.
① D0~D7
② A0~A12, RBA0~5
③ RD
ROMCS
WR
RAMCS
MDMCS
NG
See 2.3.6.3. NG EXAMPLE
OK
Go to the next page.

CROSS REFERENCE:

NG EXAMPLE()

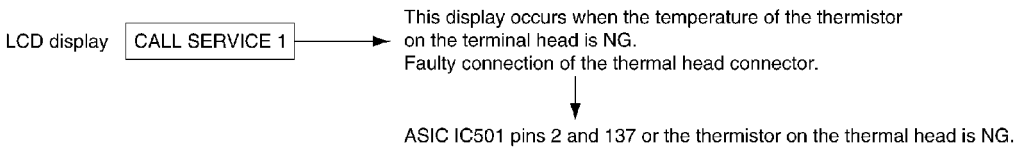
CHECK THE STATUS OF THE DIGITAL BOARD()

POWER SUPPLY BOARD SECTION()



CROSS REFERENCE:
CHECK THE STATUS OF THE DIGITAL BOARD()

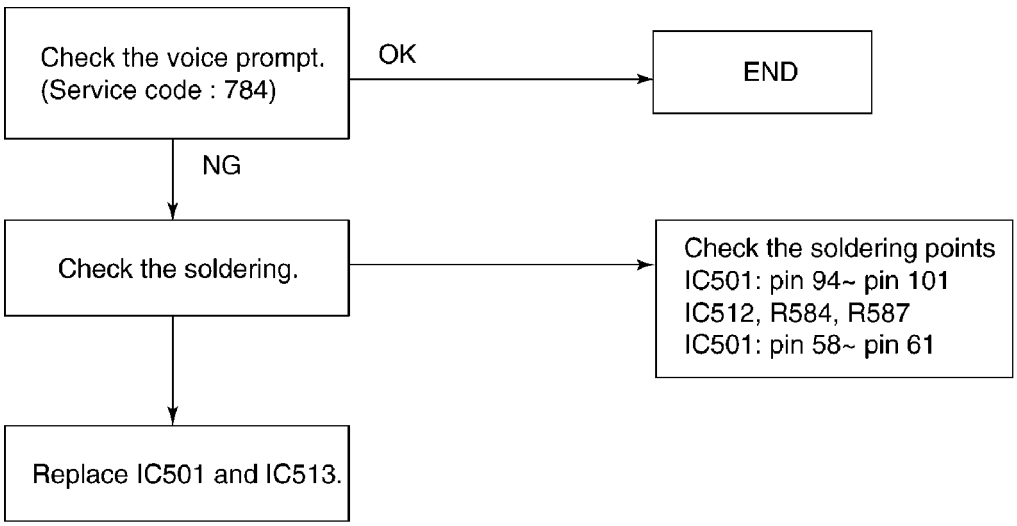
Other NG example while the power is ON and the LCD displays the following.


LCD display
CALL SERVICE 1
This display occurs when the temperature of the thermistor on the terminal head is NG.
Faulty connection of the thermal head connector.
ASIC IC501 pins 2 and 137 or the thermistor on the thermal head is NG.

Note:
Refer to LCD MESSAGES (for KX-FM189S)().

2.3.6.2. FLASH MEMORY (IC501)

If the unit is working correctly but the VOICE GUIDANCE (voice prompt) is not audible, you should check the Flash Memory.



A voice message is pre-recorded in the Flash Memory (IC512). So, when you find an IC512 malfunction and replace it with a new one. You have to pre-record the voice message by using a special ROM.

How to Use the Special ROM
(Voice Message Recording ROM)

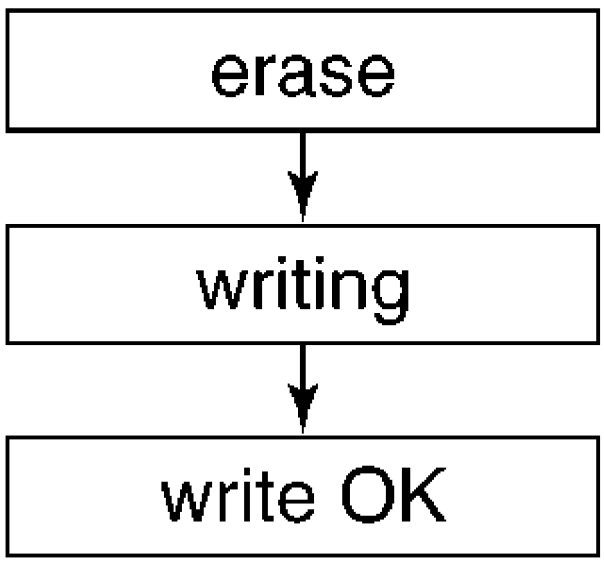
1. Turn the AC power OFF.

2. Replace the regular system ROM with the special ROM.

3. Turn the AC power ON.

4. The Voice Message Recording starts automatically.

LCD changes

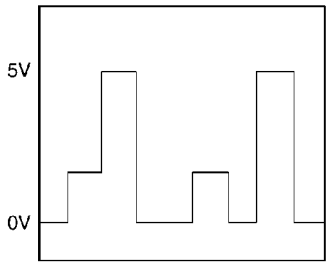


5. Turn the AC power OFF.

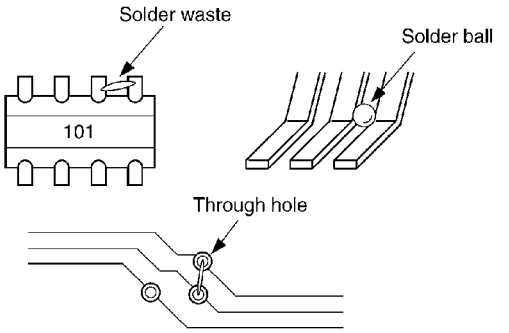
6. Replace the special ROM with the regular system ROM.

2.3.6.3. NG EXAMPLE

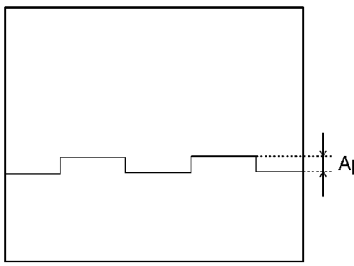
1.



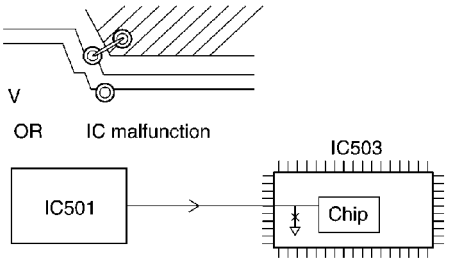
Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.



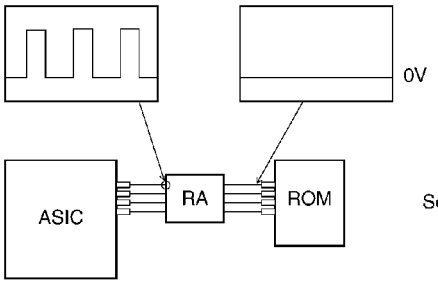
2.



Short between the signal line and GND.



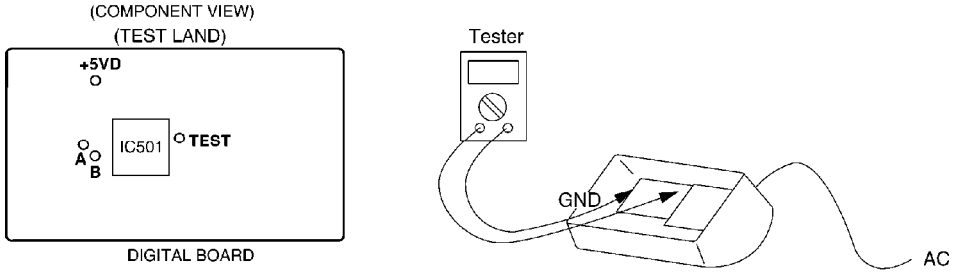
3.



Solder fault on RA.

2.3.6.4. CHECK THE STATUS OF THE DIGITAL BOARD

Please check the status (voltage) of test lands **A** and **B**.
The result may tell you a defective point.



- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the **TEST** point and **+5V** land, and turn on the AC power for a few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

Defective point	Check point voltage		Check items
	A	B	
RTC (IC501)	0V	0V	IC501(RTC is included in IC501)
DRAM (IC503)	0V	5V	IC503(8,23 pin), R533, R534, C547, C549, IC501(88, 89 pin)
MODEM (IC505)	5V	0V	IC501(77 pin), IC505(115~117, 90~92 pin), RA505, RA506
ALL OK	5V	5V	

- This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all connected to the ASIC properly and that control from the ASIC is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

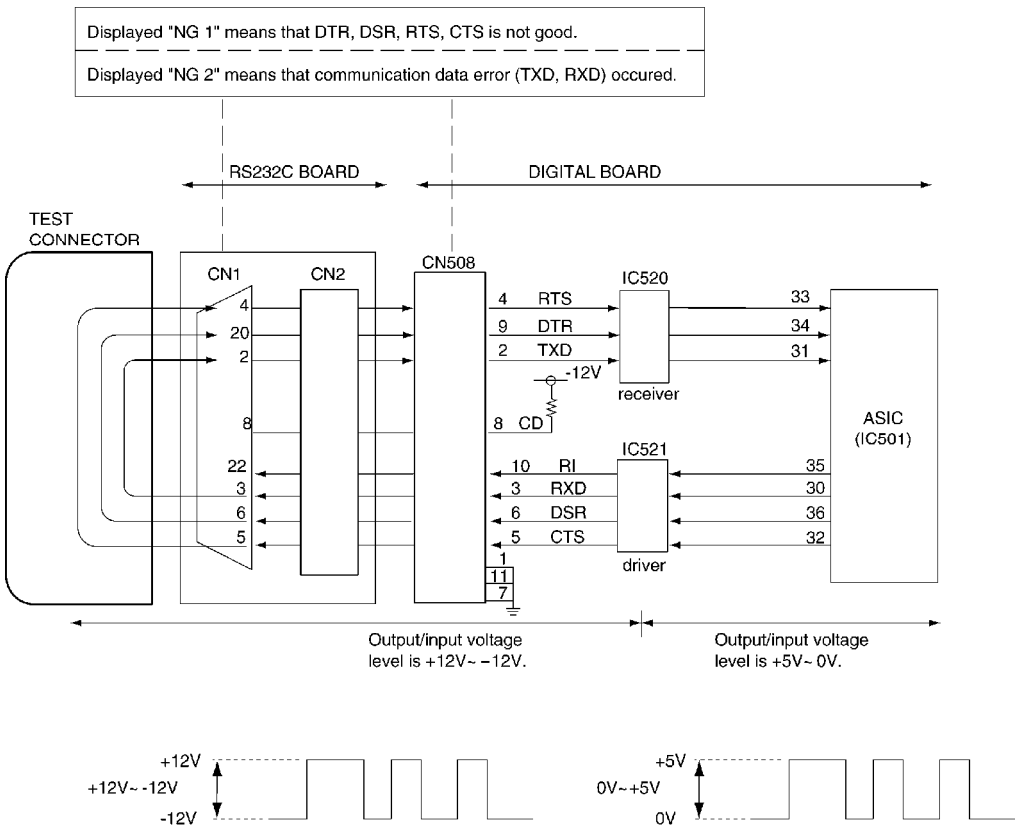
If you still have a problem with the digital board, please refer to **NG wave pattern**.

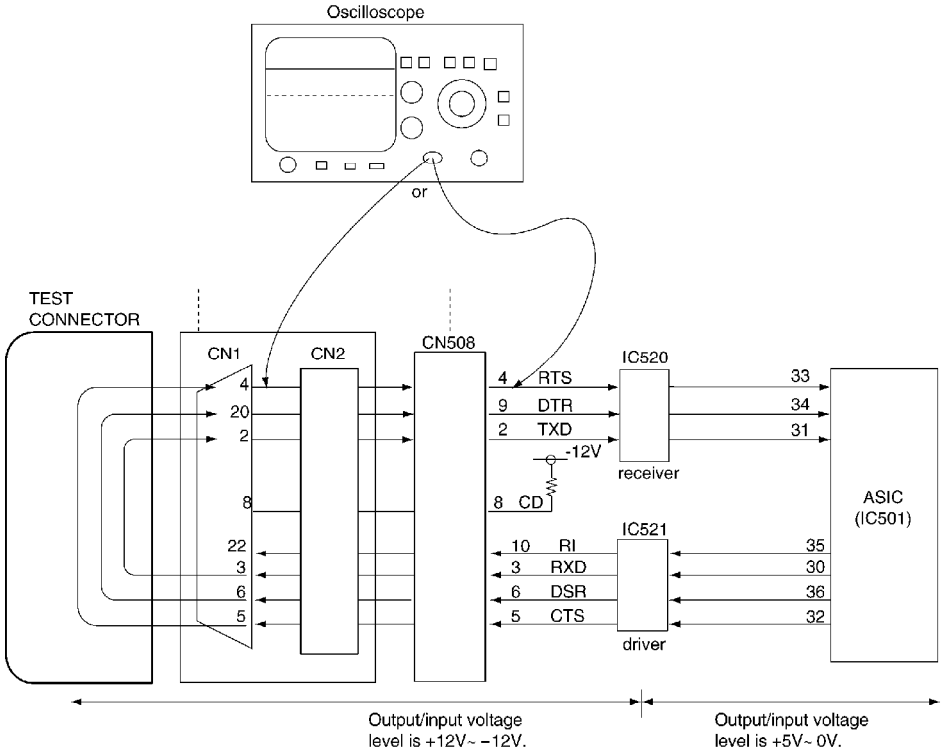
2.3.7. RS-232C SERIAL COMMUNICATION

This model has a communication port designed for RS-232C serial communication. (The EIA standards specify the interface cable type (No. RS232C) and the voltage levels.
If you use the TEST CONNECTOR, you can easily check the communication port without a PC. The connector should be wired so that the output signal can return to the input port. (The transmitted data is received by the unit.) You do not need to do any difficult operations. You can get a test result by a simple key operation (#9000

```
NOTATION PUBLIC "ISO 8632/3//NOTATION BINARY ENCODING//EN"
ENTITY SYSTEM "_asterisk.tif"
```

870). / The result (OK or NG) is displayed on LCD.

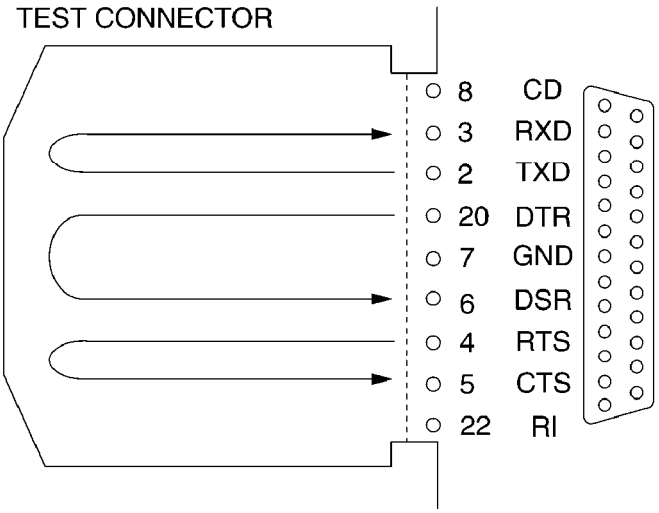

Displayed "NG 1" means that DTR, DSR, RTS, CTS is not good.
Displayed "NG 2" means that communication data error (TXD, RXD) occured.
RS232C BOARD
DIGITAL BOARD
TEST CONNECTOR
CN1
CN2
CN508
IC520
IC521
4 RTS
9 DTR
2 TXD
-12V
receiver
8 CD
10 RI
3 RXD
6 DSR
5 CTS
driver
ASIC (IC501)
33
34
31
35
30
36
32
4
20
2
8
22
3
6
5
1
11
7
Output/input voltage level is +12V~ −12V.
Output/input voltage level is +5V~ 0V.
+12V
+12V~ -12V
-12V
+5V
0V~+5V
0V



The electric circuit for this RS-232C port is simple. It is logically controlled by ASIC IC501, driver IC521 and receiver IC520.

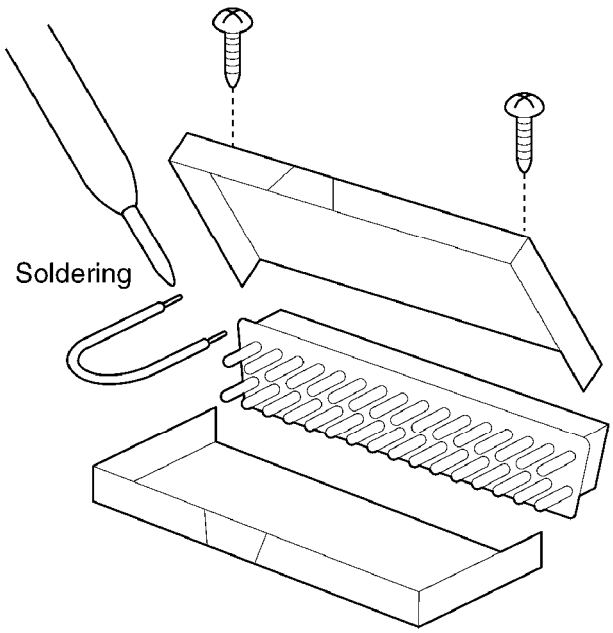
Check voltage while testing the RS-232C cable.
If the voltage level of signal at IC501, IC520 and IC521 is not 0V ~ 5V, replace IC501.
If the voltage level of signal at CN508 is not -15V ~ +15V, replace IC520 and IC521.

The TEST CONNECTOR is provided as an option. / Or you can get a connector available on the market and make the TEST CONNETOR as shown below.



Connection

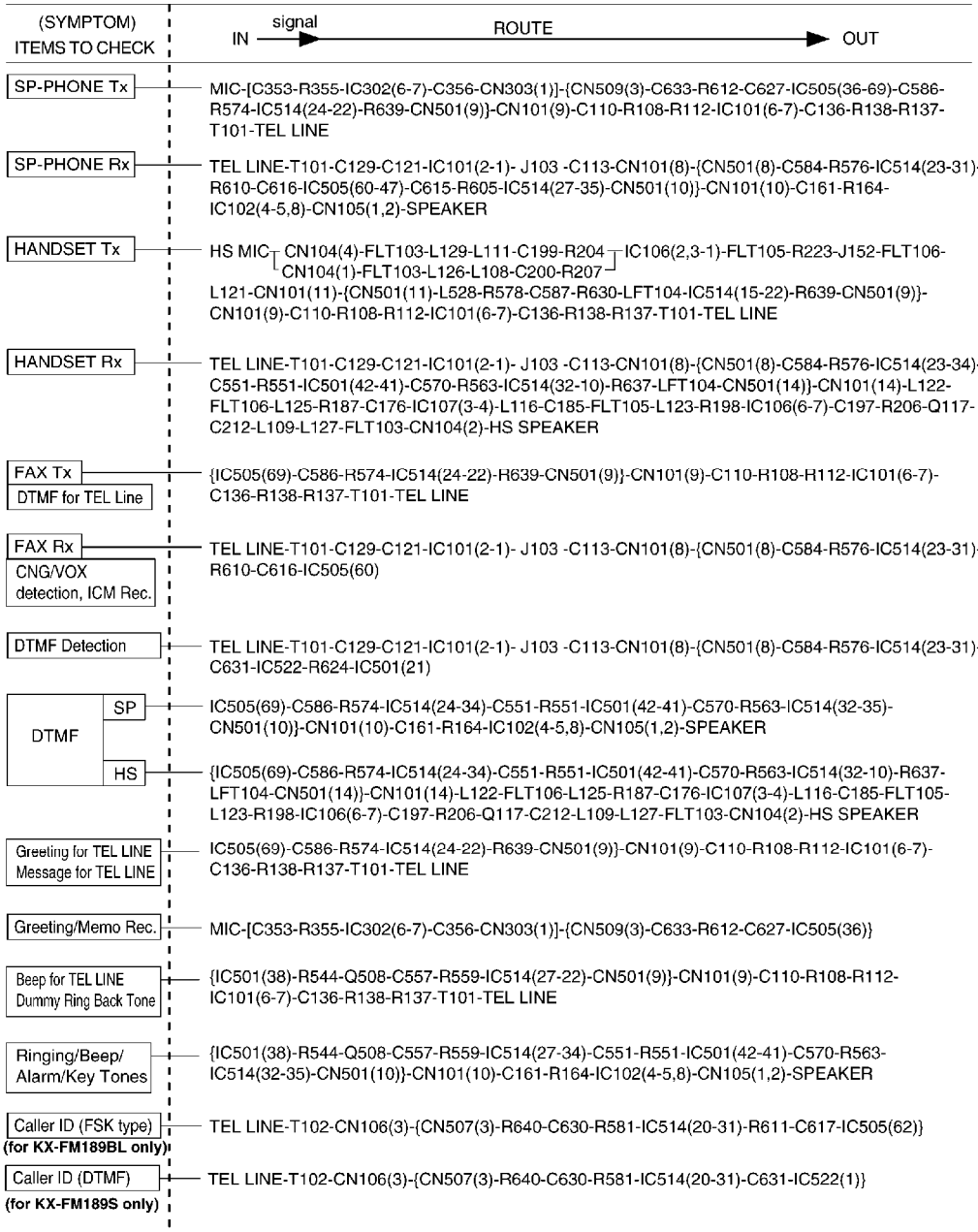
Wire the lead from **Pin 2** to **3**.
Wire the lead from **Pin 4** to **5**.
Wire the lead from **Pin 20** to **6**.



2.3.8. ANALOG BOARD SECTION

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

2.3.8.1. CHECK SHEET

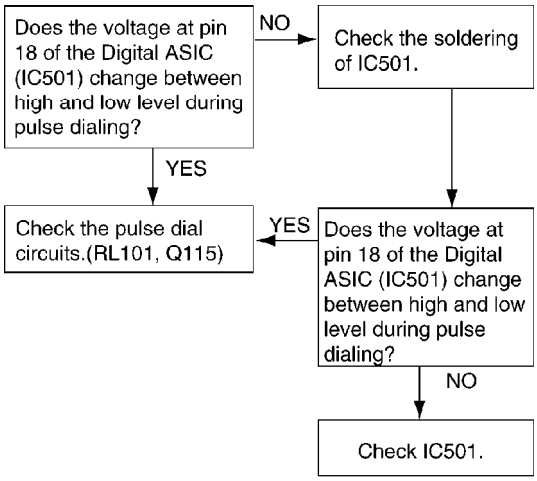


Note:
{ }: Inside the digital board / [ ]: Inside the operation board

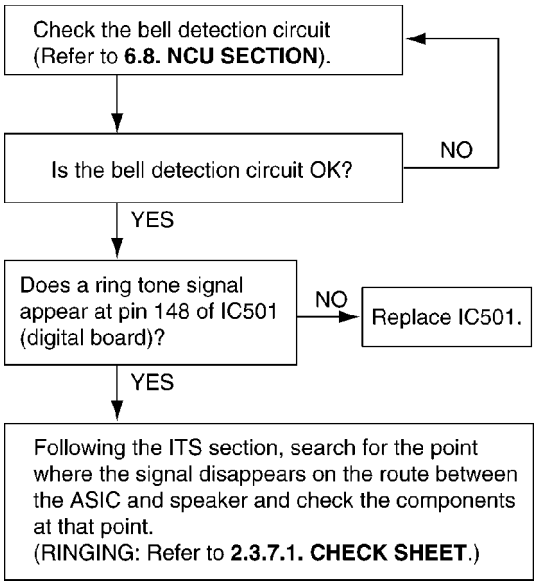
2.3.8.2. DEFECTIVE ITS (Integrated Telephone System) SECTION

1. No handset and speakerphone transmission / reception
Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. CHECK SHEET() is useful for this investigation.

2. No pulse dialing

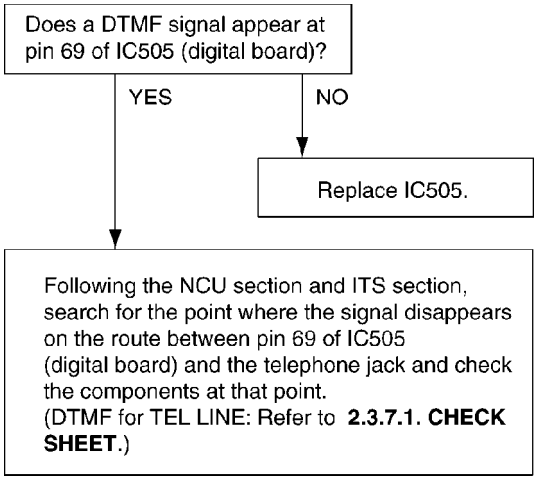

Does the voltage at pin 18 of the Digital ASIC (IC501) change between high and low level during pulse dialing?
NO
Check the soldering of IC501.
YES
Check the pulse dial circuits.(RL101, Q115)
YES
Does the voltage at pin 18 of the Digital ASIC (IC501) change between high and low level during pulse dialing?
NO
Check IC501.

3. No ring tone (or No bell)


Check the bell detection circuit (Refer to 6.8. NCU SECTION).
Is the bell detection circuit OK?
NO
YES
Does a ring tone signal appear at pin 148 of IC501 (digital board)?
NO
Replace IC501.
YES
Following the ITS section, search for the point where the signal disappears on the route between the ASIC and speaker and check the components at that point.
(RINGING: Refer to 2.3.7.1. CHECK SHEET.)

CROSS REFERENCE:
CHECK SHEET()
NCU SECTION()

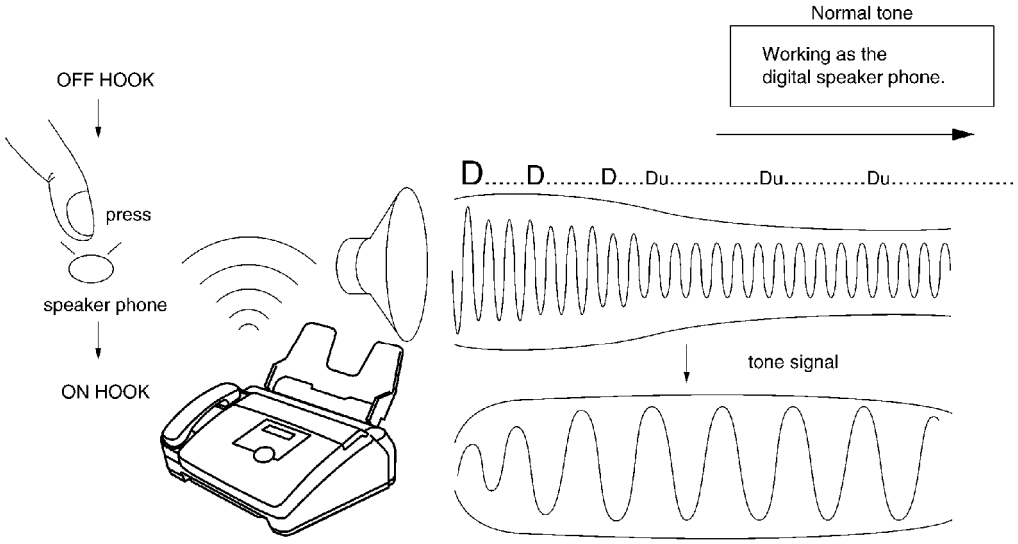
4. No tone dialing


Does a DTMF signal appear at pin 69 of IC505 (digital board)?
YES
NO
Replace IC505.
Following the NCU section and ITS section, search for the point where the signal disappears on the route between pin 69 of IC505 (digital board) and the telephone jack and check the components at that point.
(DTMF for TEL LINE: Refer to 2.3.7.1. CHECK SHEET.)

CROSS REFERENCE:
CHECK SHEET()

2.3.9. DIGITAL SPEAKERPHONE

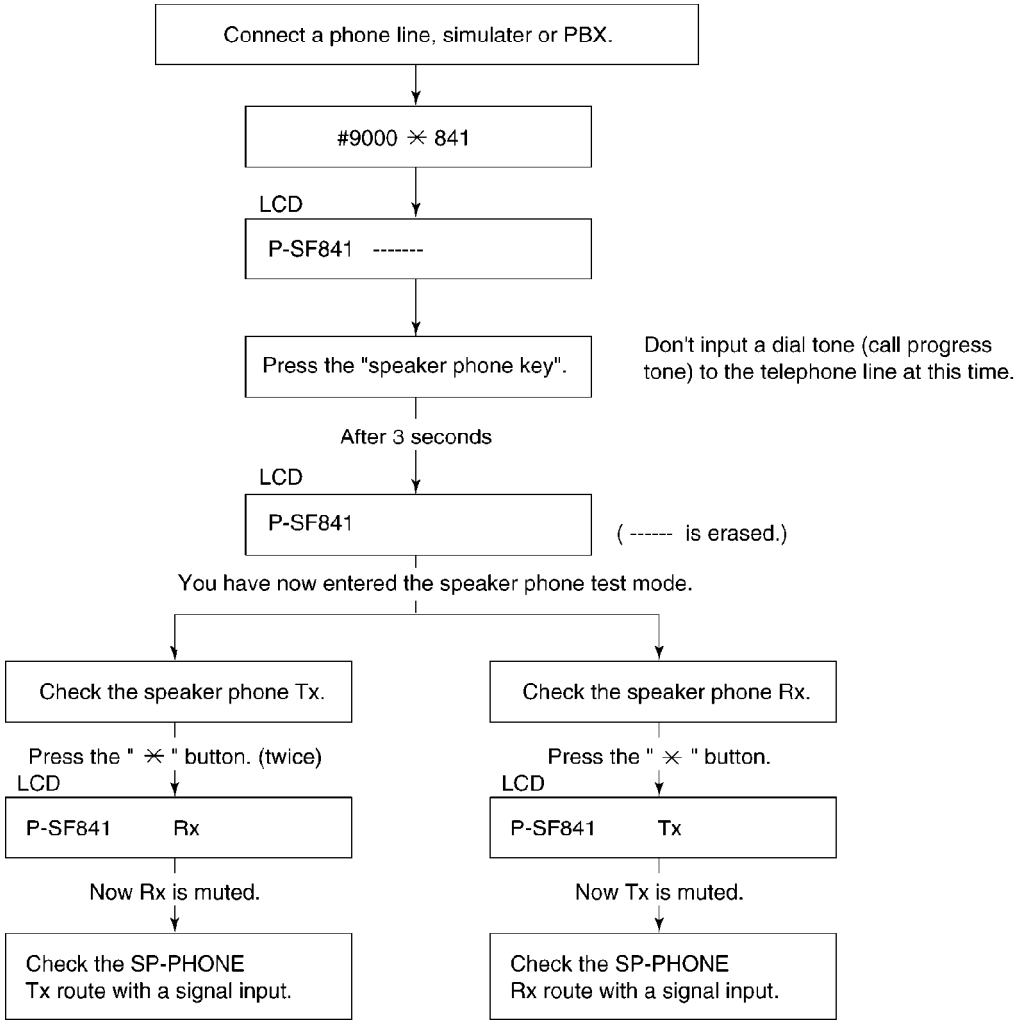
The digital speakerphone has different features from the analog speakerphone.
The analog speakerphone switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The higher-level signal (either TX or RX) can pass through the route.
Therefore, you never hear the other party's voice while you are talking. However, the digital speakerphone allows you to hear the other party's voice while you are talking. So both Tx and Rx are active at the same time. There is also a defference in the troubleshooting procedures between the two types.
At the start of communication, during the initial 2~3 correspondences, the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then duplex communication becomes available.
Learning occurs during the initial 2~3 correspondences in order to set the appropriate parameters for duplex communication.



You cannot check the digital speaker phone by the signal route test mentioned in the Analog Board Section because the level is always changing as stated above.
Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or the speaker phone Rx without any disturbances.

HOW TO USE THE **841** SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 ✳ 841.


Connect a phone line, simulater or PBX.
#9000 ✳ 841
LCD
P-SF841 -------
Press the "speaker phone key".
Don't input a dial tone (call progress tone) to the telephone line at this time.
After 3 seconds
LCD
P-SF841
(------ is erased.)
You have now entered the speaker phone test mode.
Check the speaker phone Tx.
Check the speaker phone Rx.
Press the " ✳ " button. (twice)
Press the " ✳ " button.
LCD
LCD
P-SF841 Rx
P-SF841 Tx
Now Rx is muted.
Now Tx is muted.
Check the SP-PHONE Tx route with a signal input.
Check the SP-PHONE Rx route with a signal input.

CROSS REFERENCE:
ANALOG BOARD SECTION()

2.3.10. POWER SUPPLY BOARD SECTION

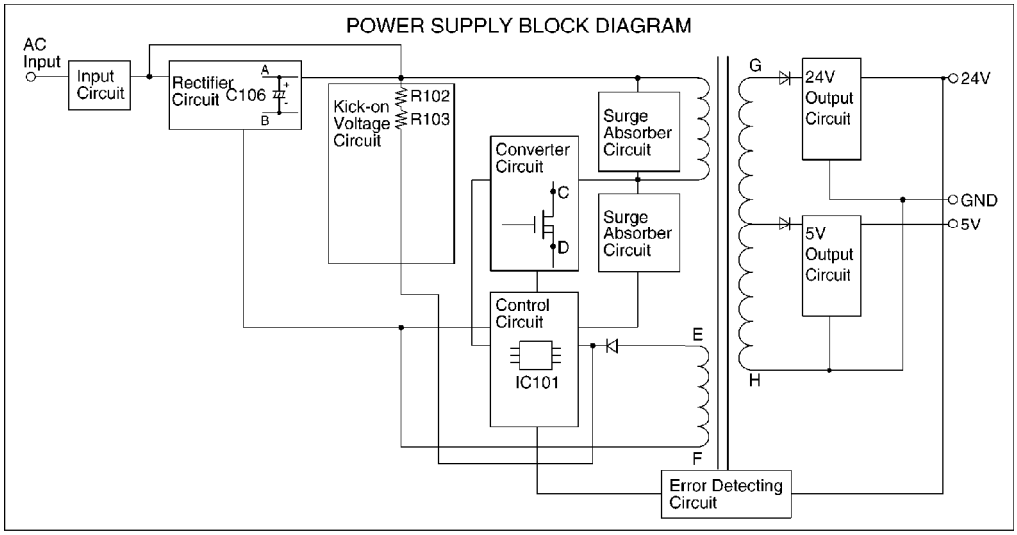
2.3.10.1. KEY COMPONENTS FOR TROUBLESHOOTING

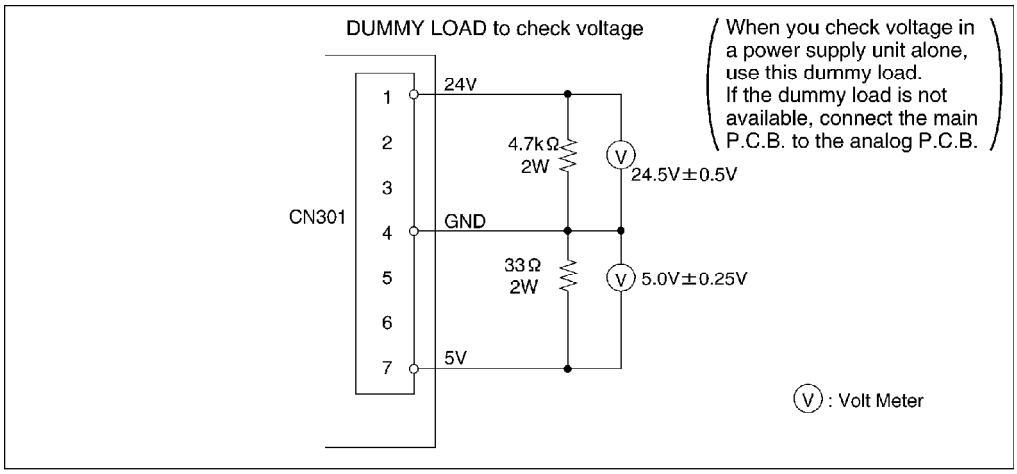
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

Caution:

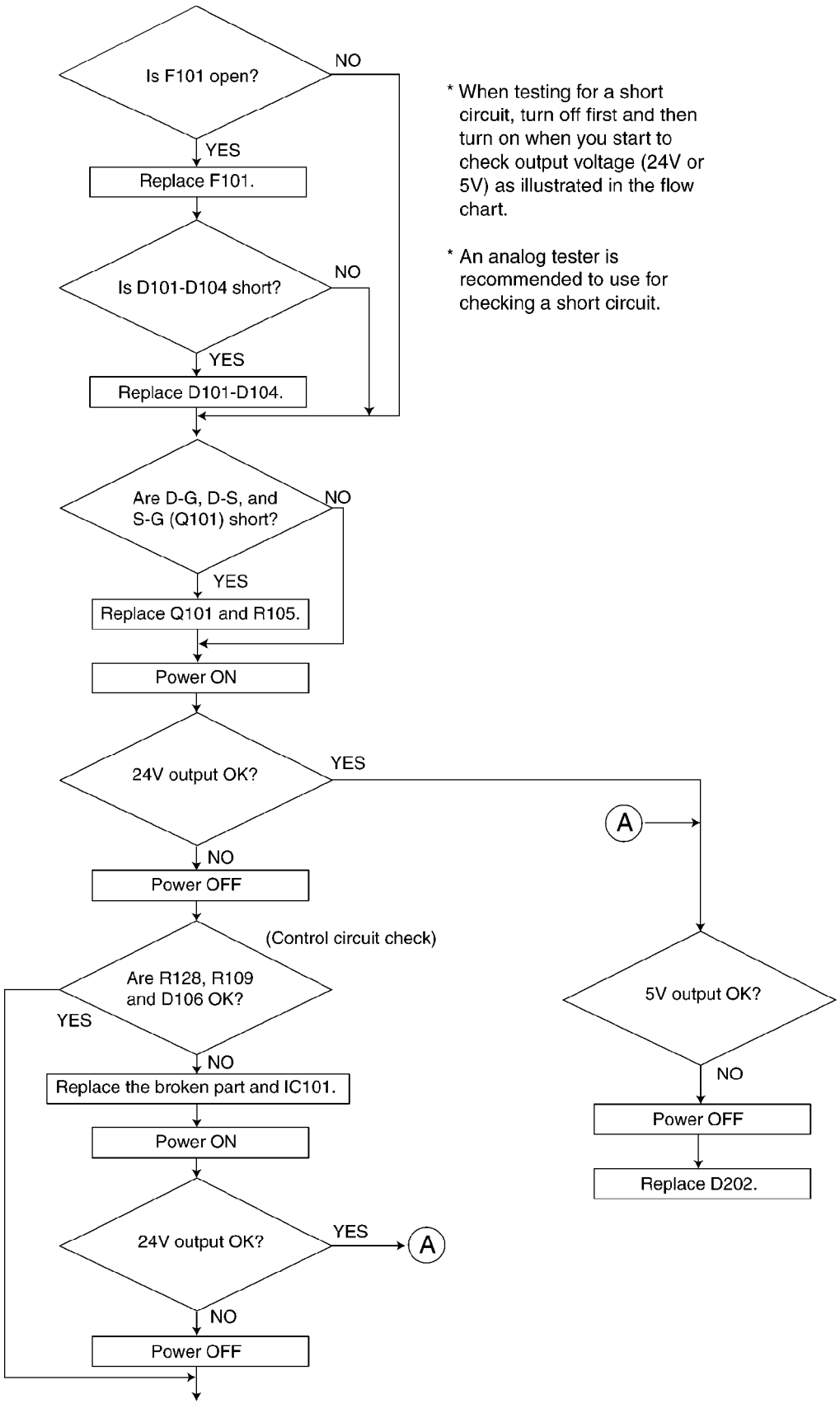
If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

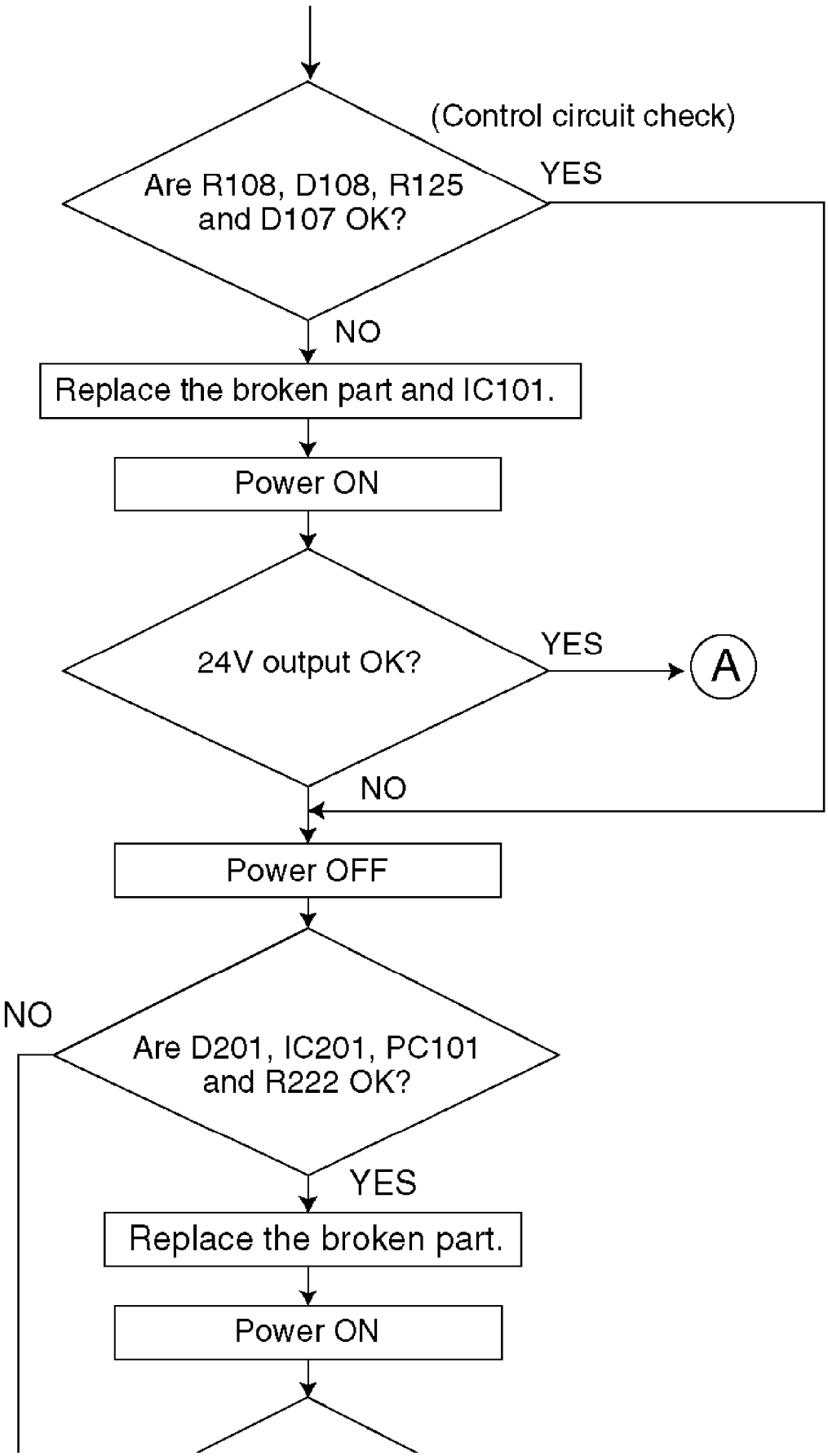
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.

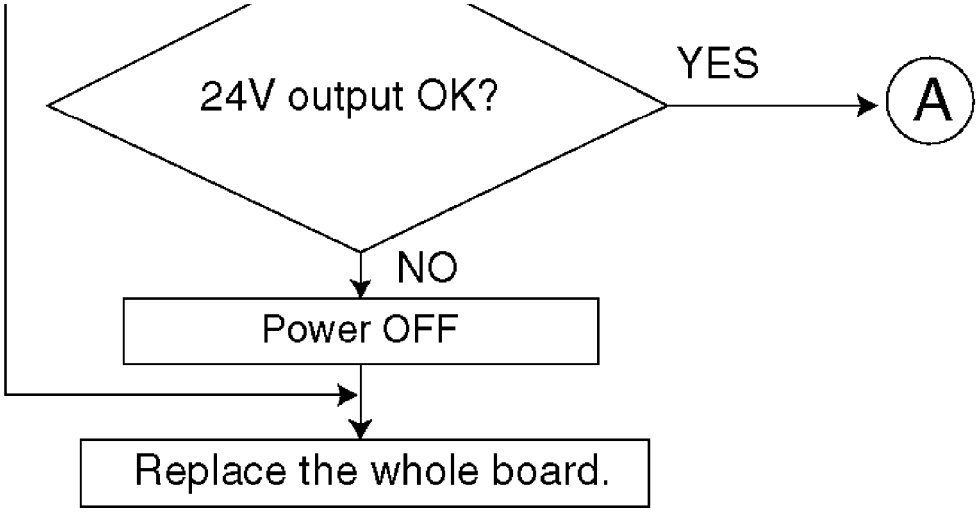




2.3.10.2. TOROUBLESHOOTING FLOW CHART


Is F101 open?
NO
YES
Replace F101.
Is D101-D104 short?
NO
YES
Replace D101-D104.
Are D-G, D-S, and S-G (Q101) short?
NO
YES
Replace Q101 and R105.
Power ON
24V output OK?
YES
NO
Power OFF
(Control circuit check)
Are R128, R109 and D106 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
A
5V output OK?
NO
Power OFF
Replace D202.
* When testing for a short circuit, turn off first and then turn on when you start to check output voltage (24V or 5V) as illustrated in the flow chart.
* An analog tester is recommended to use for checking a short circuit.


(Control circuit check)
Are R108, D108, R125 and D107 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
NO
Are D201, IC201, PC101 and R222 OK?
YES
Replace the broken part.
Power ON



2.3.10.3. BROKEN PARTS REPAIR DETAILS

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuits, F101 will melt (open).

In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.

This is due to a very high voltage through the Gate circuit which is composed of R128, R109, D106 and IC101.

You should change all of the parts listed as follows.

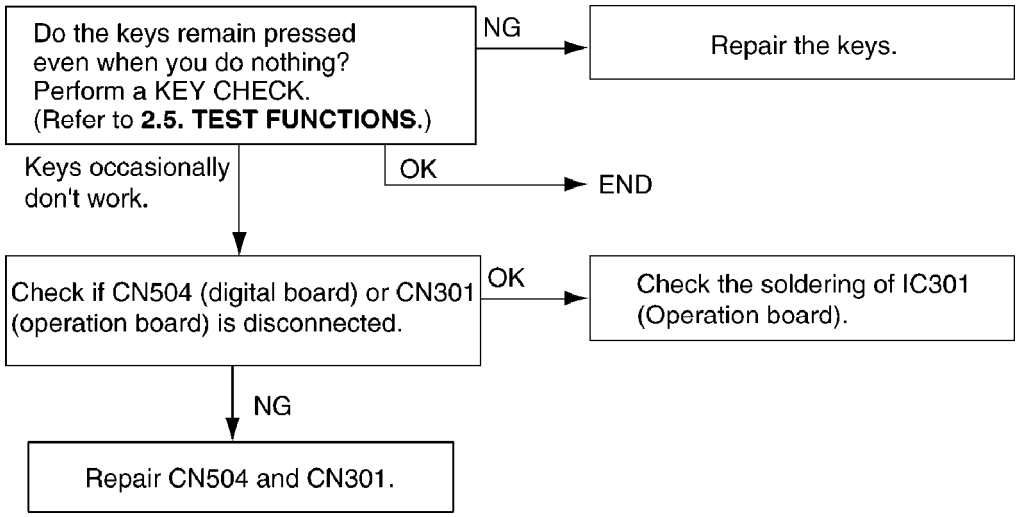
F101, Q101, R128, R109, D106, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

2.3.11. OPERATION PANEL SECTION

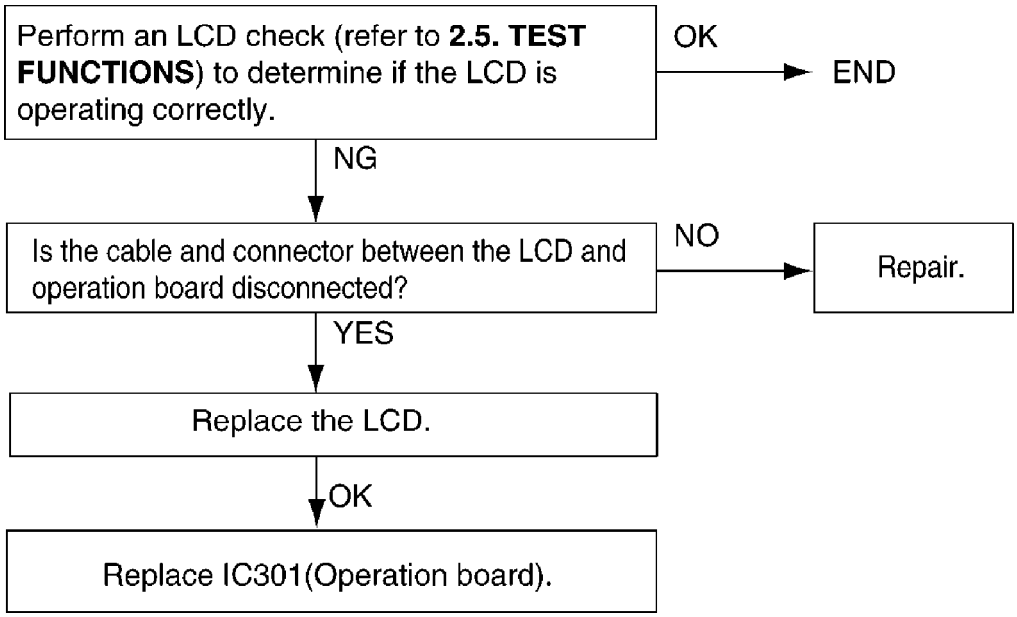
2.3.11.1. NO KEY OPERATION


Do the keys remain pressed even when you do nothing? Perform a KEY CHECK. (Refer to 2.5. TEST FUNCTIONS.)
NG
Repair the keys.
Keys occasionally don't work.
OK
END
Check if CN504 (digital board) or CN301 (operation board) is disconnected.
OK
Check the soldering of IC301 (Operation board).
NG
Repair CN504 and CN301.

CROSS REFERENCE:

TEST FUNCTIONS()

2.3.11.2. NO LCD INDICATION

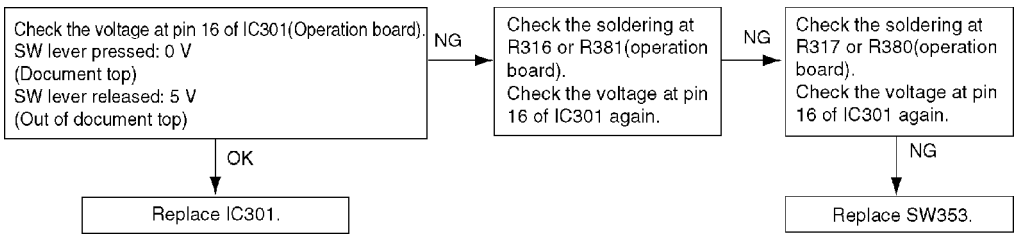


CROSS REFERENCE:
TEST FUNCTIONS()

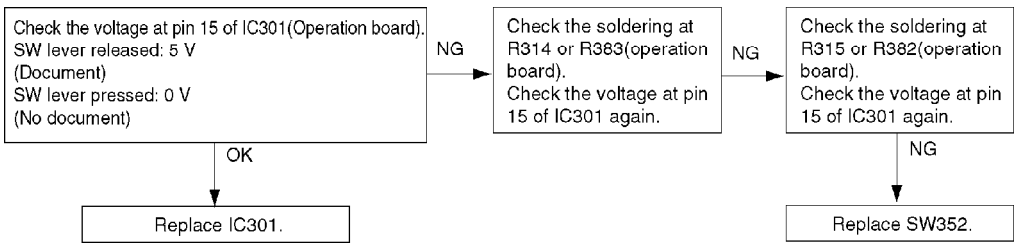
2.3.12. SENSOR SECTION

Refer to SENSORS AND SWITCHES() for the circuit descriptions.
The Test Function makes the sensor circuit check easier. (Refer to TEST FUNCTIONS().) / For example, as for "COVER OPEN SENSOR", "CO" is turned ON/OFF on the display when you open or close the front cover. Also, document sensor, read position sensor, recording paper sensor and jam sensor are turned ON/OFF by the copy operation. Therefore, each sensor can be checked for proper mechanical operation. / As for the electric check, check whether each voltage is right or not with following flowchart turning each sensor lever ON/OFF manually. Refer to LCD MESSAGES (for KX-FM189S)().

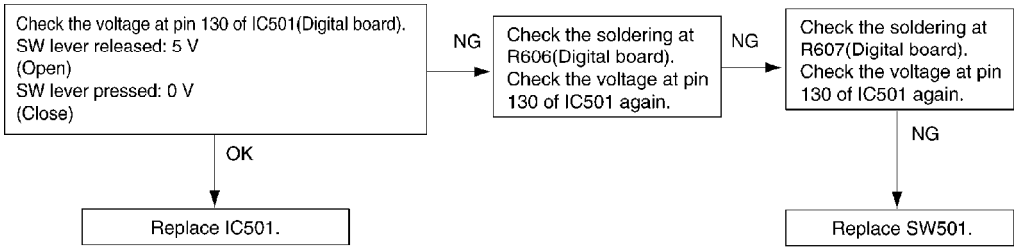
2.3.12.1. CHECK THE DOCUMENT TOP SW (SW353)....."REMOVE DOCUMENT"


Check the voltage at pin 16 of IC301(Operation board).
SW lever pressed: 0 V
(Document top)
SW lever released: 5 V
(Out of document top)
NG
Check the soldering at R316 or R381(operation board).
Check the voltage at pin 16 of IC301 again.
NG
Check the soldering at R317 or R380(operation board).
Check the voltage at pin 16 of IC301 again.
OK
NG
Replace IC301.
Replace SW353.

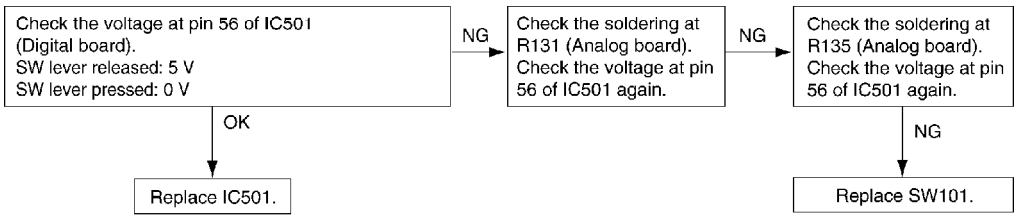
2.3.12.2. CHECK THE DOCUMENT SET SW (SW352)....."CHECK DOCUMENT"


Check the voltage at pin 15 of IC301(Operation board).
SW lever released: 5 V
(Document)
SW lever pressed: 0 V
(No document)
NG
Check the soldering at R314 or R383(operation board).
Check the voltage at pin 15 of IC301 again.
NG
Check the soldering at R315 or R382(operation board).
Check the voltage at pin 15 of IC301 again.
OK
NG
Replace IC301.
Replace SW352.

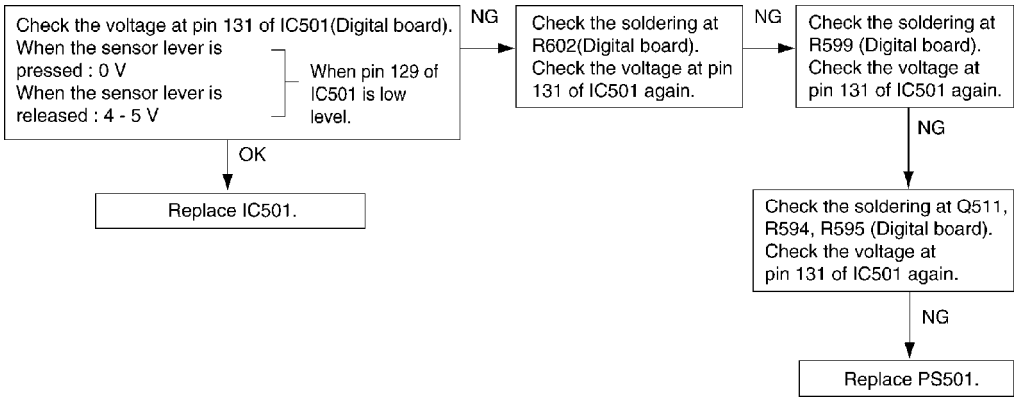
2.3.12.3. CHECK THE COVER OPEN AND THE FILM END SW (SW501)....."COVER OPEN or CHECK FILM"


Check the voltage at pin 130 of IC501(Digital board).
SW lever released: 5 V
(Open)
SW lever pressed: 0 V
(Close)
NG
Check the soldering at R606(Digital board). Check the voltage at pin 130 of IC501 again.
NG
Check the soldering at R607(Digital board). Check the voltage at pin 130 of IC501 again.
OK
NG
Replace IC501.
Replace SW501.

2.3.12.4. CHECK THE HOOK SWITCH (SW101)

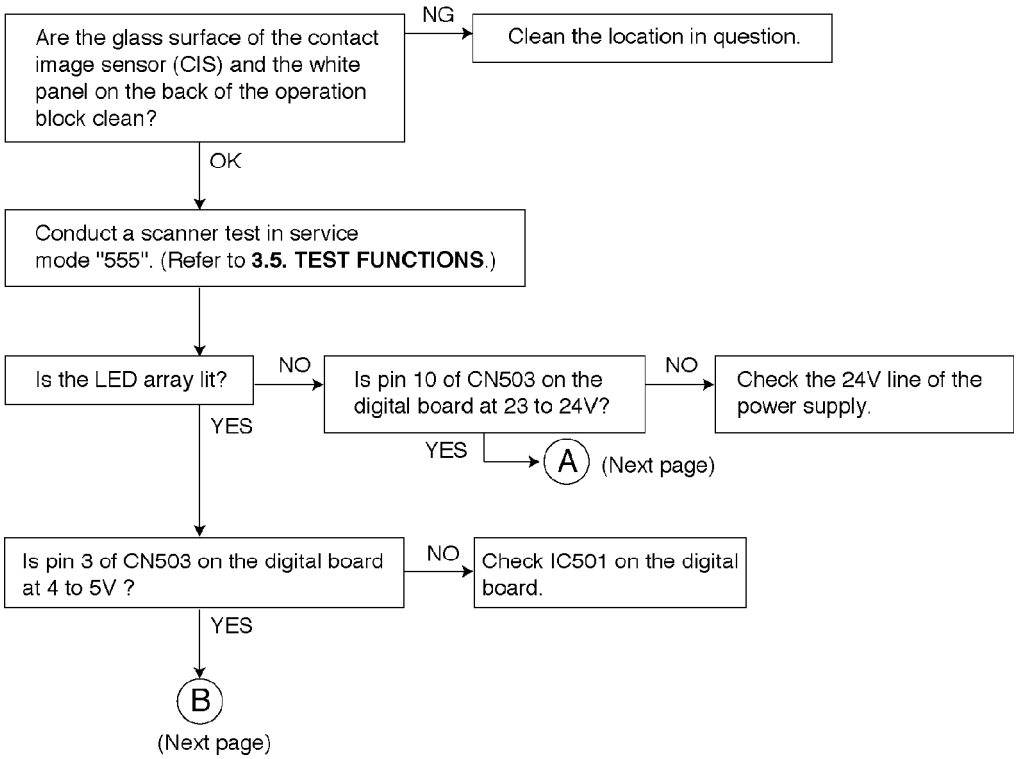

Check the voltage at pin 56 of IC501 (Digital board).
SW lever released: 5 V
SW lever pressed: 0 V
NG
Check the soldering at R131 (Analog board). Check the voltage at pin 56 of IC501 again.
NG
Check the soldering at R135 (Analog board). Check the voltage at pin 56 of IC501 again.
OK
NG
Replace IC501.
Replace SW101.

2.3.12.5. CHECK THE PAPER TOP SENSER (PS501)....."PAPER JAMMED"


Check the voltage at pin 131 of IC501(Digital board).
When the sensor lever is pressed : 0 V
When the sensor lever is released : 4 - 5 V
When pin 129 of IC501 is low level.
NG
Check the soldering at R602(Digital board). Check the voltage at pin 131 of IC501 again.
NG
Check the soldering at R599 (Digital board). Check the voltage at pin 131 of IC501 again.
NG
OK
Check the soldering at Q511, R594, R595 (Digital board). Check the voltage at pin 131 of IC501 again.
NG
Replace IC501.
Replace PS501.

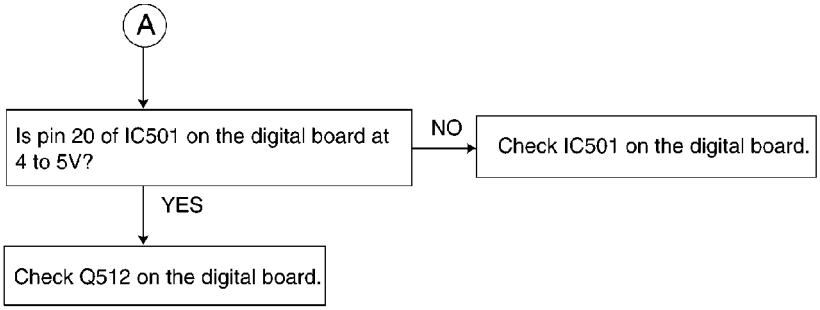
2.3.13. CIS (Contact Image Sensor) SECTION

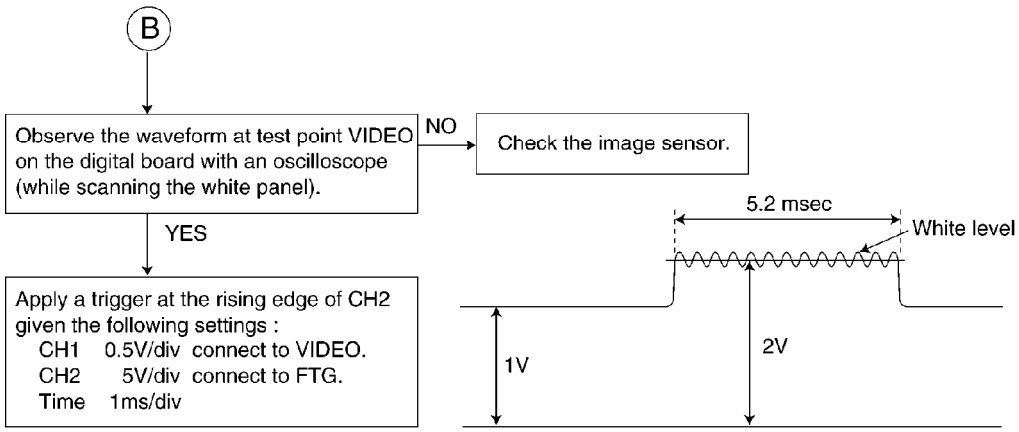
Refer to SCANNING BLOCK().

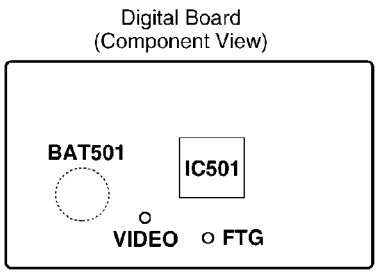

Are the glass surface of the contact image sensor (CIS) and the white panel on the back of the operation block clean?
NG
Clean the location in question.
OK
Conduct a scanner test in service mode "555". (Refer to 3.5. TEST FUNCTIONS.)
Is the LED array lit?
NO
Is pin 10 of CN503 on the digital board at 23 to 24V?
NO
Check the 24V line of the power supply.
YES
YES
A
(Next page)
Is pin 3 of CN503 on the digital board at 4 to 5V ?
NO
Check IC501 on the digital board.
YES
B
(Next page)

CROSS REFERENCE:

TEST FUNCTIONS()

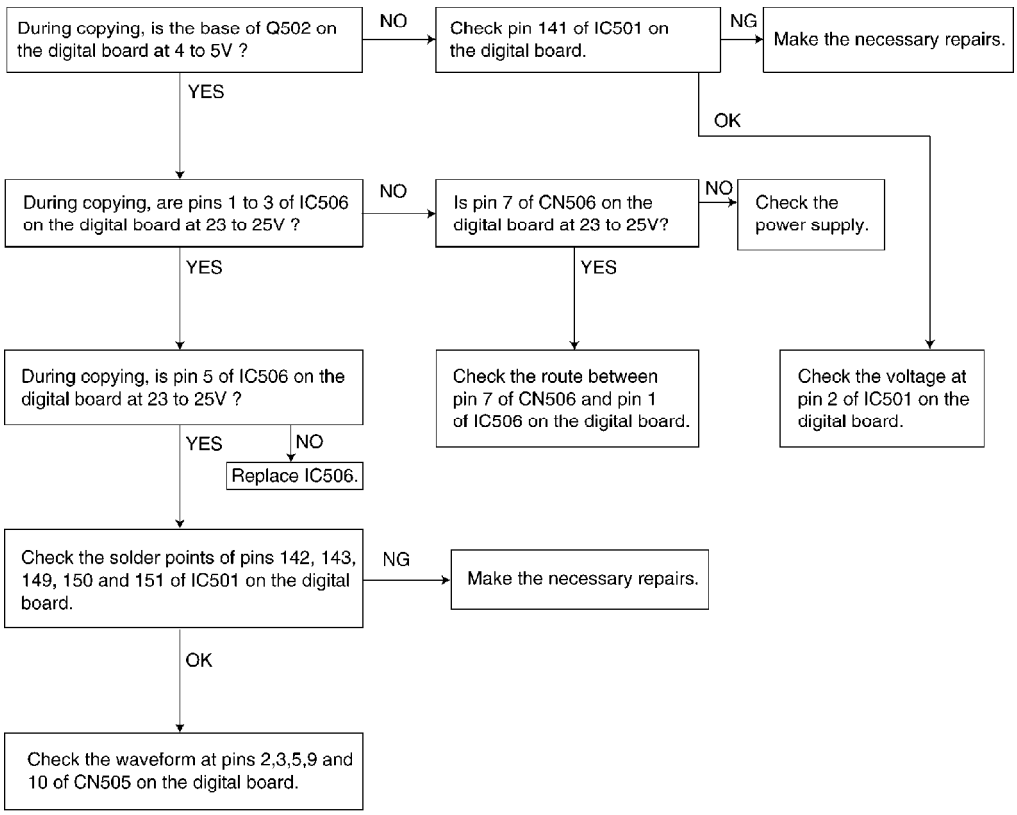



B
Observe the waveform at test point VIDEO on the digital board with an oscilloscope (while scanning the white panel).
NO
Check the image sensor.
YES
Apply a trigger at the rising edge of CH2 given the following settings :
CH1 0.5V/div connect to VIDEO.
CH2 5V/div connect to FTG.
Time 1ms/div
5.2 msec
White level
1V
2V



2.3.14. THERMAL HEAD SECTION

Refer to THERMAL HEAD().


During copying, is the base of Q502 on the digital board at 4 to 5V ?
NO
Check pin 141 of IC501 on the digital board.
NG
Make the necessary repairs.
YES
OK
During copying, are pins 1 to 3 of IC506 on the digital board at 23 to 25V ?
NO
Is pin 7 of CN506 on the digital board at 23 to 25V?
NO
Check the power supply.
YES
YES
During copying, is pin 5 of IC506 on the digital board at 23 to 25V ?
Check the route between pin 7 of CN506 and pin 1 of IC506 on the digital board.
Check the voltage at pin 2 of IC501 on the digital board.
YES
NO
Replace IC506.
Check the solder points of pins 142, 143, 149, 150 and 151 of IC501 on the digital board.
NG
Make the necessary repairs.
OK
Check the waveform at pins 2,3,5,9 and 10 of CN505 on the digital board.

2.3.15. PANA LINK

Download
If you need the PANALINK software, please download from the Home Page address below.
http://www.kme.panasonic.co.jp/telecom/fax/world.htm

List of PANA LINK and help instructions
To obtain information about the PANA LINK application, use the help function.
For help, follow these steps.
For Windows 95/98 Users:

1. Click the Start button.

2. Click Programs.

3. Click PANA LINK.

4. Click PANA LINK HELP.

5. Click index or Contents and choose the subject you need help with.

[FUNCTIONS OF THE PANA LINK APPLICATION]

Applications	Functions
PANA LINK	Introduction
	Hardware requirements for PANA LINK
	About Install/Uninstall
	PANA LINK
	How to Start and Exit PANA LINK
	About the PANA LINK Main Panel
	A List of the Shortcut Keys
PRINT	Printing from a file
	Checking the printing status
transmit the faxsimile from the personal	About the Send a Fax panel
	Transmit an image file
	How to send a fax from a printed page
	Cover page
	Save and printing of the transmission data
	How to make a peculiar transmission
	Quick transmission
	Sending to several people in one operation (Broadcast)
	Sending at a certain time
	Sending several documents together
	The Advanced dialog
receive a faxsimile with the personal	Receiving a facsimile
	New fax notification
	How to make a peculiar transmission
	Forward the received facsimile automatically
	Forward the received facsimile as an e-mail message
	Stamp the received date (Time/Date stamp)
make a phone call	Make a phone call
	How to set the telephone number
	Dialing the telephone number manually
	Dial using the One-Touch keys
	Dial using the Address Book
	Dial the same person again
scan	How to scan
	Enlarge and reduce
	Image quality
	Intensity
copy	How to copy

Applications	Functions
Communication Log	About the Communication Log
	About the Sent Log
	About the Receiving Log
	About the Outbox
	Save the log
	Print the log
	Display the image of the facsimile document
	Send the log as an e-mail message
	Resend
	Change the destination of an unsent fax
	Forward
	Delete
	Change a log subject
	Find
	About the Find dialog box
	Sort
	Menu list

Applications	Functions
Address Book	About Address Book
	How to edit the data of the partners
	How to add a new entry
	How to update
	How to delete
	How to edit the Address Book
	How to create a new Address Book
	How to change the name of the Address Book
	How to delete an Address Book
	How to change the Address Book
	How to edit the distribution group
	How to create a group
	How to change the group name
	How to delete a group
	How to add members to a group
	How to change groups
	How to select the number
	Sending a phone or fax number from the Address Book to the F LINK Main Panel
	How to move and copy
	Move and copy
	Other functions
	Find
	Sorting
	Simple print of the Address Book
	Print the Address Book in detail form
	Import and export the Address Book
	Save the Address Book
	Menu list
	Shortcut keys
Viewer	About the Viewer
Setup	Setup
	Line setup
	Transmit setup
	Reception setup
	System setup
	User Information
	Cover Page
One-Touch	One-touch keys
	How to register and change an entry
	How to delete an entry
	How to switch between fax and phone numbers
	How to select a number

Applications	Functions
Troubleshooting	Common problems
	Problems with transmission
	Problems with reception
	Problems with scan and copy
	Problems with connection
	Problems about the display of errors

2.3.15.1. PROBLEMS WITH PC SOFTWARE

2.3.15.1.1. GENERAL

PROBLEM	CAUSE & REMEDY
I cannot open a TIFF file.	~ You must change the compression format of the file. For exa convert an image using WANG Imaging, proceed as follows: 1. Click on [Start], point to [Programs] -- [Accessories], then click [Imaging]. 2. Open the TIFF file that you cannot open in [Viewer] of PANA LINK. 3. Open the [Page] menu, and click [Convert]. --The [Convert] dialogue box appears. 4. Click the [Compression] tab, then choose [CCITT Group 3 (1d) Modified Huffman] fro Compression drop-down list. 5. Click [OK]. --The file´s compression format is changed.
I cannot send a fax from the PC at the specified time.	~ The date and time of the PC may be set incorrectly. Adjust it. cannot be set correctly, consult your PC supplier.
The date and time that prints on the top of each page sent from the PC is incorrect.	~ The date and time of the PC may be sent incorrectly. Adjust it cannot be set correctly, consult your PC supplier.
I do not know how to move the PANA LINK main panel, because there is no title bar.	~ Point to an area with no buttons and drag to the desired spac
I do not know whether the PANA LINK main panel is active or not.	~ The brightness of the main panel display shows you whether the PANA LINK main panel is active. <Active -- bright, Non active -- dark>
A quick tip does not appear when I hold the mouse pointer over a button in the PANA LINK main panel, although I have set to display this.	~ If the PANA LINK main panel is non-active, the quick tip does appear. Confirm again after making the PANA LINK main panel by clicking anywhere on it.
The telephone number set in the main panel display disappears, and the display shows [For storing a phone or fax number.] explanation of the button and so on.	~ The quick tip is displayed. Move the mouse cursor out of the LINK main panel. If you do not need quick tips, open the [Setup dialogue and select [OFF] of [Quick Tip] in [System] tab.
The PANA LINK main panel disappears.	~ Look in the task tray (in the task bar). If you do not find the P LINK icon, it is closed. If you find the icon, the PANA LINK main just minimised or reduced to an icon. / Double-click the icon in tray or open the menu by right-clicking the fax icon and select .

PROBLEM	CAUSE & REMEDY
PANA LINK main panel disappears just after initialising.	~ The PANA LINK main panel is set to minimise when PANA LIN starts. Double-click the icon in the task tray or open the menu l clicking the fax icon, and select [Restore]. / If you do not want t happen each time you start PANA LINK, click the [Setup] in the LINK main panel, and leave the [Start minimized] check box bla the [Program start-up settings] in [System] tab.
I want to delete all of the telephone numbers set in the main panel display.	~ Press [STOP] button.
I cannot recognize the last part of the entry in the address list of the [Address Book] or [Communication Log].	~ Put the cursor on the line between the buttons, the cursor ch shape and you can expand the area by dragging, or double-clic
I do not want to send a cover page with every fax.	~The setting of the cover page is [ON]. To deactivate the settin [Setup] dialogue by clicking on the [Setup] in the main panel, a check [Default Add Cover Page at every Transmission] in the [(Page] tab.
I want to select a telephone number from [Address Book] onto the PANA LINK main panel, but I selected a fax number by mistake.	~ You can change your selection in the PANA LINK main panel. click on the number in the main panel display until the telephor number appears. You can also right-click the entry to select a s number.
I cannot use the [DIAL] button, even though I specified a telephone number.	~ If there is transmission data or a document is set in the fax, y only use the fax transmission function, If you want to make a p call, delete the transmission data.
When I exit PANA LINK, the [Viewer] does not close.	~ [Viewer] can be operated separately, so when PANE LINK is c remains open.
PANA LIMK does not work properly.	~ Click the button to exit PANA LINK, and restart. If PANA LINK does not close, press the [Ctrl+Alt+Delete].

2.3.15.1.2. PRINTING

PROBLEM	CAUSE & REMEDY
I cannot print.	~ Please verify the following. 1. Driver settings: If you change the driver settings in the Panasonic PANA LINK-S PRINT dialog may be able to print. 2. Preview window: If the image is not properly displayed in the Preview window, your file may c errors. Try printing a different file. Also, there may be a problem with the application you are usi 3. Bad connection between PC and printer: Verify the printer is properly connected and plugged 4. Re-install: Uninstall PANA LINK, reboot your PC, then re-install it. 5. Port setting: If the printer port is not set properly, you cannot print. A. Click the Start button, point to Settings then Printer. B. Choose Properties from the printer´s pop-up menu. / --The Properties dialogue box appears. C. Click the Details tab, and check the Print to the following port drop down list box. If a differe selected, Choose the serial port COM1-COM4 connected with the fax machine in the D. Click the Print the using the following driver drop down list box. / If PANA LINK-S PRINT is n re-select it. E. Click the Port setting button. / - Set each parameter as follows: / - Bits per second: 19200 / - - Parity: None / - Stop bits: 1 / - Flow control: Hard ware F. Click the OK button. G. Click the OK button.

2.3.15.1.3. TARNSMISSION

PROBLEM	CAUSE & REMEDY
[Sending a fax failed.] message is displayed.	~ Possible causes are as follows. / --- Telephone circuit i good. --- You received a call-waiting signal. / --- The other party stopped reception. / --- The other party ran out of recordi paper. / Transmit again after checking with the other part
[No response] message is displayed.	~ The other party did not answer the call or the line was Transmit again after waiting a while. ~ The dialing mode setting (tone or pulse) is not correct. the [Setup] dialogue box and check the dialling mode set check box in [Line] tab.
I cannot mode an international transmission.	~ Set the fax machine to the overseas transmission mod the operating instructions.
The length of the transmitted image differs slightly from the original.	~ Set the [Resolution] to [Fine] (200 x 200dpi) and transm

2.3.15.1.4. RECEPTION

PROBLEM	CAUSE & REMEDY
The fax machine receives a fax, but I want to receive it on the PC.	~ You may have checked [Receive directly to facsimile u the [Reception] tab in the [Setup] dialogue box. If so, clic check box to deactivate. ~ The setting of the PC LINK on the fax machine is off. Tu ~ The PANA LINK application is not operate. Start the PA application.
The PC receives a fax, but I want to receive it on the fax machine.	~ Open the [Setup] dialogue box, and check [Receive dir facsimile unit] in the [Reception] tab.
I want to print out the received fax with another printer.	~ Print after selecting the desired printer from the [Print] dialogue box.
[Receiving a fax failed.] message is displayed.	~ Possible causes are as follows. / --- The line condition good. / --- The reception was interrupted by a call waiting Check with the other party and try again.

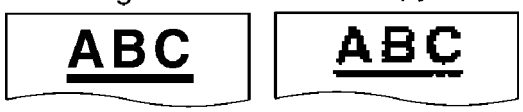
2.3.15.1.5. SCAN AND COPY

PROBLEM	CAUSE & REMEDY
I cannot scan.	~ The fax machine may be in use. Try again after the othe operation is completed. ~ There may not be enough space on the hard disk. Try a after deleting unnecessary files or closing unused applic ~ There might not be enough RAM. Try again after closin applications. / Restart the PC, and try again.
The document is not pulled into the document feeder.	~ Confirm that a maximum of 10 pages are set correctly.
A document is jammed.	~ You attempted to transmit a document longer than 600 Remove the jammed document and try again.
The recording paper is jammed.	~ Remove the jammed recording paper, reinsert it, and tr
Even after clicking [Stop], scanning continues.	~ Please wait. It may take a while for the cancel request t accepted.

2.3.15.1.6. ERROR MESSAGE

PROBLEM	CAUSE & REMEDY
[Initialization failed.] is displayed.	~ Check the connection of the PC and the fax machine. ~ The setting of the PC LINK on the fax machine is off. Tu

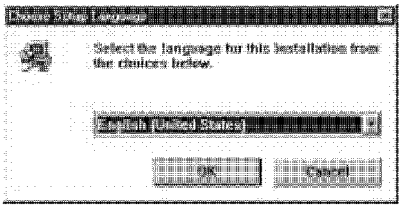
2.3.15.1.7. PRINT QUALITY

PROBLEM	CAUSE & REMEDY
The printing quality is poor.	~ Some paper has instructions recommending which sid print on. Try turning the paper over.
The printing is faint. Original Copy 	~ You may have used paper with a cotton and/or fiber co that is over 20%, such as letterhead or resume paper.
A dirty pattern or a black line appears on the printouts.	~ The glass or rollers are dirty. Clean them. See the oper instructions.

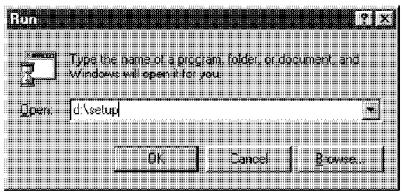
1 Start Windows 95 or Windows 98 and close all applications.

2 Insert the included CD into your CD-ROM drive.

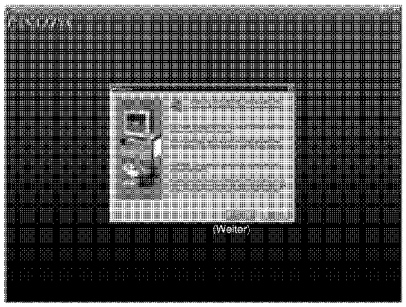
- The **[Choose Setup Language]** dialogue box will appear.
  Select the desired language that you use with this software from the pull-down menu.
  Click **[OK]**.



- If **[Choose Setup Language]** dialogue box does not appear:
  The installation will automatically start.
- If **[Choose Setup Language]** dialogue box does not appear and the installation does not start automatically:
  Click **[Start]**, choose **[Run...]**. Type "**d:\setup**" (where "**d:**" is the drive letter of your CD-ROM drive). Click **[OK]**.
  (If you are not sure what the drive letter is for your CD-ROM drive, please use



3 The installation will automatically start.



4 Follow the instructions on the screen until all files have been installed.

5 Be sure to read the **[Readme]** file for more information.

Note:

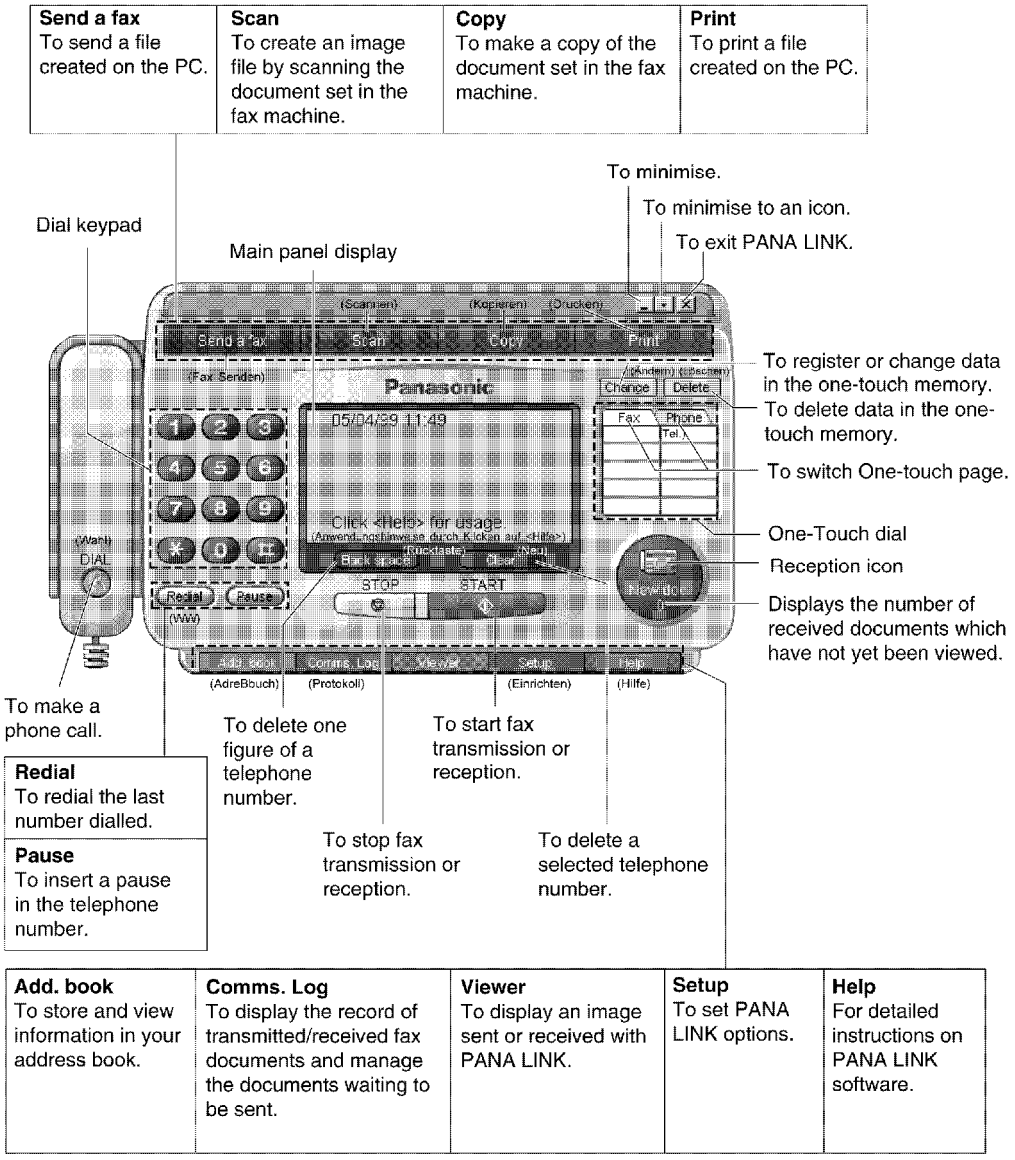
- For detailed instructions on PANA LINK software, use the **[Help]** function.
- The screens shown in these instructions are

• The display illustrations may differ slightly from the display of the actual product.

• The display details are subject to change for improvement without notice.

1 Click **[Start]**.

2 Point to **[Programs]**, point to **[PANA LINK]** and click **[PANA LINK]**.
- The PANA LINK main panel will appear.


Send a fax
To send a file created on the PC.
Scan
To create an image file by scanning the document set in the fax machine.
Copy
To make a copy of the document set in the fax machine.
Print
To print a file created on the PC.
To minimise.
To minimise to an icon.
To exit PANA LINK.
Dial keypad
Main panel display
To register or change data in the one-touch memory.
To delete data in the one-touch memory.
To switch One-touch page.
One-Touch dial
Reception icon
Displays the number of received documents which have not yet been viewed.
To make a phone call.
To delete one figure of a telephone number.
To start fax transmission or reception.
To stop fax transmission or reception.
To delete a selected telephone number.
Redial
To redial the last number dialled.
Pause
To insert a pause in the telephone number.
Add. book
To store and view information in your address book.
Comms. Log
To display the record of transmitted/received fax documents and manage the documents waiting to be sent.
Viewer
To display an image sent or received with PANA LINK.
Setup
To set PANA LINK options.
Help
For detailed instructions on PANA LINK software.

2.4. PROGRAMMING AND LISTS

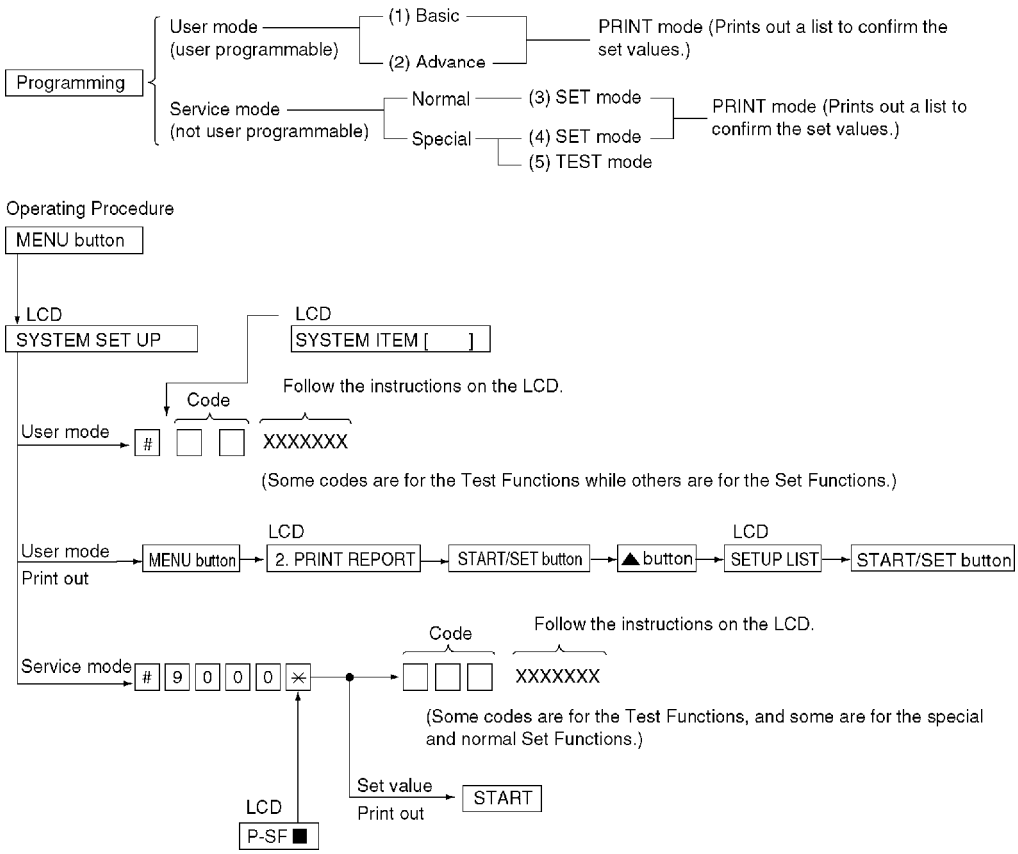
The programming functions are used to program the various features and functions of the machine, and to test the machine.

This facilitates communication between the user and the service man while programming the unit.

2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

2.4.2. OPERATION FLOW



Note:

Refer to LCD MESSAGES (for KX-FM189S)() and BUTTON NAME (for KX-FM189S)().

2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

2.4.3.1. KX-FM189BL

SETUP LIST

[BASIC FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#01	SET DATE & TIME	01 Jan. 2000 12:00AM	
#02	YOUR LOGO		
#03	YOUR FAX NUMBER		
#04	PRINT SENDING REPORT	ERROR	[ERROR,ON,OFF]
#06	TAD/FAX RING COUNT	2	[1...4,TOLL SAVER,RINGER OFF]
#10	RECORDING TIME	VOX	[VOX,1...9MIN]
#11	REMOTE TAD ID	ON	[ON,OFF]
	ID =	111	
#14	PC LINK	ON	[ON,OFF]

Code

Set Value

[ADVANCED FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#22	JOURNAL AUTO PRINT	ON	[ON,OFF]
#23	OVERSEAS MODE	OFF	[ON,OFF]
#25	DELAYED TRANSMISSION	OFF	[ON,OFF]
	DESTINATION =		
	START TIME =	12:00AM	
#26	AUTO CALLER ID LIST	ON	[ON,OFF]
#30	SILENT FAX RECOGNITION RING	3	[3...9]
#36	RCV REDUCTION	92%	[72,86,92,100]
#39	LCD CONTRAST	NORMAL	[NORMAL,DARKER]
#41	FAX ACTIVATION CODE	ON	[ON,OFF]
	CODE =	*9	
#42	MESSAGE ALERT	OFF	[ON,OFF]
#43	RECORDING TIME ALERT	OFF	[ON,OFF]
#44	MEMORY RECEIVE ALERT	ON	[ON,OFF]
#46	FRIENDLY RECEPTION	ON	[ON,OFF]
#47	FAX VOICE GUIDANCE	ON	[ERROR,ON,OFF]
#54	GREETING MSG. RECORDING TIME	16s	[16s,60s]

NOTE : If you change from 60sec. to 16sec.
your-greeting will be erased and your new greeting will be limited to 16 seconds.

#60	MESSAGE TRANSFER	OFF	[ON,OFF]
	DESTINATION =		
#61	TRANSFER GREETING	CHECK	[CHECK,RECORD,ERASE]
#67	ICM MONITOR	ON	[ON,OFF]
#68	ECM SELECTION	ON	[ON,OFF]

NOTE : You cannot change the setting of this feature,
if there are stored documents in memory.

#70	PAGER CALL	OFF	[ON,OFF]
	DESTINATION =		
#71	MELODY RINGER	A	[A,B,C]
#76	CONNECTING TONE	ON	[ON,OFF]
#77	AUTO ANSWER MODE	TAD/FAX	[TAD/FAX,FAX ONLY,TEL/FAX]
#78	TEL/FAX DELAYED RING	2	[1...9]
#80	SET DEFAULT (EXCEPT #68)		

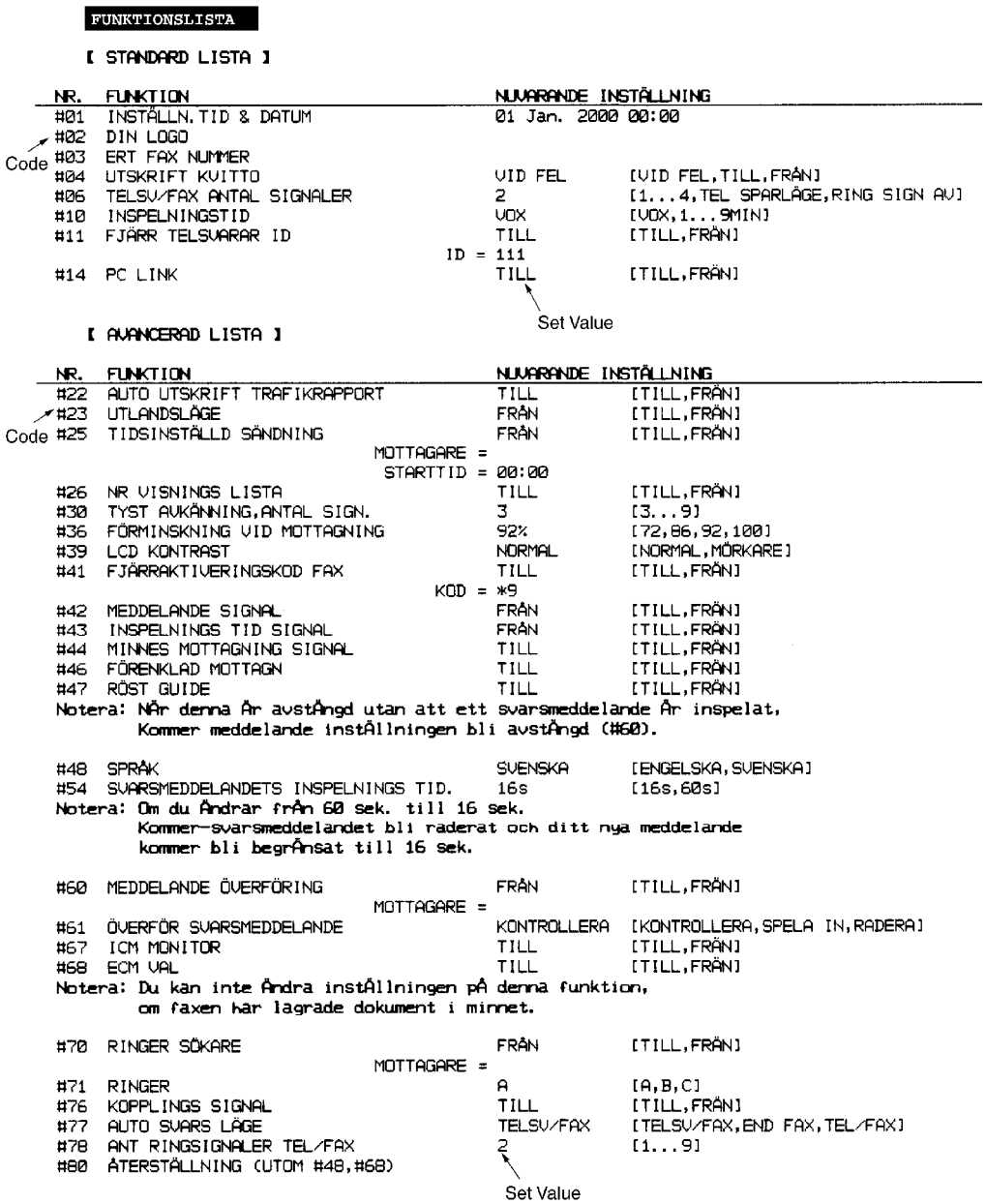
Code

Set Value

Note:

The above values are the default values.

2.4.3.2. KX-FM189S


FUNKTIONSLISTA
[STANDARD LISTA]
NR. FUNKTION NUVARANDE INSTÄLLNING
#01 INSTÄLLN.TID & DATUM 01 Jan. 2000 00:00
#02 DIN LOGO
Code #03 ERT FAX NUMMER
#04 UTSKRIFT KVITTO VID FEL [VID FEL,TILL,FRÅN]
#06 TELSV/FAX ANTAL SIGNALER 2 [1...4,TEL SPARLÄGE,RING SIGN AV]
#10 INSPELNINGSTID VOX [VOX,1...9MIN]
#11 FJÄRR TELSVARAR ID TILL [TILL,FRÅN]
ID = 111
#14 PC LINK TILL [TILL,FRÅN]
Set Value
[AVANCERAD LISTA]
NR. FUNKTION NUVARANDE INSTÄLLNING
#22 AUTO UTSKRIFT TRAFIKRAPPORT TILL [TILL,FRÅN]
Code #23 UTLANDSLÄGE FRÅN [TILL,FRÅN]
#25 TIDSINSTÄLLD SÄNDNING FRÅN [TILL,FRÅN]
MOTTAGARE =
STARTTID = 00:00
#26 NR VISNINGS LISTA TILL [TILL,FRÅN]
#30 TYST AVKÄNNING,ANTAL SIGN. 3 [3...9]
#36 FÖRMINSKNING VID MOTTAGNING 92% [72,86,92,100]
#39 LCD KONTRAST NORMAL [NORMAL,MÖRKARE]
#41 FJÄRRAKTIVERINGSKOD FAX TILL [TILL,FRÅN]
KOD = *9
#42 MEDDELANDE SIGNAL FRÅN [TILL,FRÅN]
#43 INSPELNINGS TID SIGNAL FRÅN [TILL,FRÅN]
#44 MINNES MOTTAGNING SIGNAL TILL [TILL,FRÅN]
#46 FÖRENKLAD MOTTAGN TILL [TILL,FRÅN]
#47 RÖST GUIDE TILL [TILL,FRÅN]
Notera: När denna är avstängd utan att ett svarsmeddelande är inspelat,
Kommer meddelande inställningen bli avstängd (#60).
#48 SPRÅK SVENSKA [ENGELSKA,SVENSKA]
#54 SVARSMEDDELANDETS INSPELNINGS TID. 16s [16s,60s]
Notera: Om du ändrar från 60 sek. till 16 sek.
Kommer svarsmeddelandet bli raderat och ditt nya meddelande
kommer bli begränsat till 16 sek.
#60 MEDDELANDE ÖVERFÖRING FRÅN [TILL,FRÅN]
MOTTAGARE =
#61 ÖVERFÖR SVARSMEDDELANDE KONTROLLERA [KONTROLLERA,SPELA IN,RADERA]
#67 ICM MONITOR TILL [TILL,FRÅN]
#68 ECM VAL TILL [TILL,FRÅN]
Notera: Du kan inte ändra inställningen på denna funktion,
om faxen har lagrade dokument i minnet.
#70 RINGER SÖKARE FRÅN [TILL,FRÅN]
MOTTAGARE =
#71 RINGER A [A,B,C]
#76 KOPPLINGS SIGNAL TILL [TILL,FRÅN]
#77 AUTO SVARS LÄGE TELSV/FAX [TELSV/FAX,END FAX,TEL/FAX]
#78 ANT RINGSIGNALER TEL/FAX 2 [1...9]
#80 ÅTERSTÄLLNING (UTOM #48,#68)
Set Value

Note:
The above values are the default values.

2.4.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	030	----------
502	Flash time (for KX-FM189BL)	X 10 ms	01~99	12	----------
502	Flash time (for KX-FM189S)	X 10 ms	01~99	09	----------
510	VOX time	1:8 sec 2: 6 sec 3: 4sec	1~3	2	----------
511	VOX sense	1:High 2: Low	1, 2	1	When the TAM (or EXT TAM) d stop recording the ICM becaus is detected on the telephone li change this setting to "LOW".
512	Vox mode	1:ON 2: OFF	1, 2	1	----------
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See Symptom/Countermeasur for long distance and internati calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OF INTERNATIONL COMMUNICAT
521	International mode select	1:ON 2: OFF	1, 2	1	See Symptom/Countermeasur for long distance and internati calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OF INTERNATIONL COMMUNICAT
522	Auto standby select	1:ON 2: OFF	1, 2	1	The resolution reverts to the d when transmission is complet
523	Receive equalizer select	1:0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is from the unit or reception can performed correctly, adjust accordingly.
524	Transmission equalizer select	1:0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is from the unit or transmission be performed correctly, adjust accordingly.
533	Message transfer auto redial time set	00~99 time	00~99	3	Selects the number of times th message transfer is redialed (including the first dialing).
534	Message transfer auto redial time line disconnection time set	005~999 sec	005~999	065	Sets the interval of message t pager call redial.
550	Memory clear: To reset the value to the default one, except the top margin (853) and left margin (854).				"START" input Turn OFF and power switch to operate corre
551	ROM check				See TEST FUNCTIONS().

Code	Function	Set Value	Effective Range	Default	Remarks
552	DTMF single tone test	1:ON 2: OFF	1, 2	2	See TEST FUNCTIONS().
553	Monitor on FAX communication select	1:OFF 2: PHASE B 3 :ALL	1~3	1	Sets whether to monitor the li signal with the unit's speaker FAX communication or not.
554	Modem test				See TEST FUNCTIONS().
555	Scan check				See TEST FUNCTIONS().
556	Motor test			0	See TEST FUNCTIONS().
557	LED test				See TEST FUNCTIONS().
558	LCD test				See TEST FUNCTIONS().
559	Document jam detection select	1:ON 2: OFF	1, 2	1	See DOCUMENT JAMS().
561	KEY test				See TEST FUNCTIONS().
571	ITS auto redial time set	X number of times	00~14	05	Selects the number of times th is redialed (not including the f
572	ITS auto redial line disconnection time set	X second	005~999	065	Sets the interval of ITS redialir
573	Remote turn-on ring number set	X number of rings	01~99	10	Sets the number of rings befo unit starts to receive a docum the TEL mode.
580	TAM continuous tone detection	1:ON 2: OFF	1, 2	1	ON : Stops TAM operation wh tone, etc. are detected.
590	FAX auto redial time set	X number of times	00~14	05	Selects the number of redial ti during FAX communication (n including the first dial).
591	FAX auto redial time disconnection time set	X second	005~999	065	Sets the FAX redial interval du FAX communication.
592	CNG transmit select	1:OFF / 2: ALL / 3: AUTO	1~3	2	Lets you select the CNG outpu during FAX transmission. ALL is output at phase A. AUTO: C output only when automatic d performed. OFF: CNG id not o phase A. Refer to SOMETIME T IS A TRANSMIT PROBLEM().
593	Time between CED and 300bps	1:75 msec / 2:500 msec / 3:1 sec	1~3	1	See Symptom/Countermeasur for long distance and internati calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OF INTERNATIONL COMMUNICAT Refer to RECEIVE PROBLEM(THE UNIT CAN COPY, BUT CA EITHER TRANSMIT/RECEIVE L DISTANCE OR INTERNATIONL COMMUNICATIONS ().

Code	Function	Set Value	Effective Range	Default	Remarks
594	Overseas DIS detection select	1:detects at the 1st time / 2: detects at the 2st time	1, 2	1	See Symptom/Countermeasur for long distance and internati calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OF INTERNATIONL COMMUNICAT Refer to SOMETIME THERE IS TRANSMIT PROBLEM() and TH CAN COPY, BUT CANNOT EIT TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONL COMMUNICATIONS ().
595	Receive error limit value set	1:5% 2: 10% / 3: 15% 4:20%	001~999	2	Sets the number of acceptable lines when the FAX reconstruc received data. Refer to RECEI PROBLEM().
596	Transmit level set	X dBm	- 15~00	09	Selects the FAX transmission Refer to SOMETIME THERE IS TRANSMIT PROBLEM ()and RI PROBLEM ().
598	Receiving sensitivity	43= -43 dBm	20~48	39	Used when there is an error pr Refer to THE UNIT CAN COPY CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OF INTERNATIONL COMMUNICAT
599	ECM frame size	1:256 2:64	1, 2	1	----------
624	AT ring time out	1:3 sec / 2: 5 sec	1, 2	1	----------
711	Dialing mode	1:PULSE 2: TONE	1, 2	2	----------
717	Transmit speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4:7200BPS / 5: 4800BPS / 6:2400BPS	1~6	1	Adjusts the speed to start trai during FAX transmission. Refe SOMETIME THERE IS A TRANS PROBLEM ()and THE UNIT CA COPY, BUT THE TRANSMISSI RECEPTION IMAGE ARE INCO ().

Code	Function	Set Value	Effective Range	Default	Remarks
718	Receive speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4:7200BPS / 5: 4800BPS / 6:2400BPS	1~6	1	Adjusts the speed to start trai during FAX reception. Refer to RECEIVE PROBLEM() and THE CAN COPY, BUT THE TRANSM AND RECEPTION IMAGE ARE INCORRECT ().
719	Ringer off in TEL/FAX mode	1:ON 2: OFF	1, 2	1	Selects the ringer switch off w call is received in the TEL/FAX
722	Redial tone detect	1:ON 2: OFF	1, 2	1	Sets the tone detection mode redialing.
724	PC-Fax ATD busy tone	1:ON 2: OFF	1, 2	2	----------
731	CPC mode	1:ON 2: OFF	1, 2	1	Sets the CPC signal detection from the converter.
732	Auto disconnect cancel time	1:350ms 2: 1800ms 3: OFF	1~3	1	----------
745	Power ON film feed	1:ON 2: OFF	1, 2	1	When the power is turned on, is wound to take up any slack.
763	CNG detect time for friendly reception	1:10 sec / 2 :20 sec / 3: 30 sec	1~3	3	Selects the CNG detection ton friendly reception.
771	T1 timer	1:35 sec / 2 :60 sec	1, 2	1	Sets a higher value when the response from the other party more time during FAX transmi
774	T4 timer	X 100 msec	00~99	0	Use this function when delay in the line and communication Mobile comm) does not work v
775	Monitoring of message transfer	1:ON 2: OFF	1, 2	2	If set to ON a message can be monitored from this unit´s SP- when transferring a message.
815	Sensor & Vox check				See TEST FUNCTIONS().
852	Print test pattern				See TEST FUNCTIONS().
853	Top margin		1~9	5	----------
854	Left margin		1~8	5	----------
861	A4 size set	1:ON 2: OFF	1, 2	1	----------
880	History list				See HISTORY().
881	Journal 2 list				See PRINTOUT EXAMPLE().
882	Journal 3 list				See PRINTOUT EXAMPLE().

Code	Function	Set Value	Effective Range	Default	Remarks
890	TEL/FAX 1st ring back tone	1:ON 2: OFF	1, 2	1	Selects whether the TEL/FAX back tone is ON or OFF in the FAX mode.
895	TEL/FAX mode receiving mode setting after bell time out	1:TAD 2: FAX	1, 2	2	FAX or TAD can be performed Fax mode after the bell time y ran out.

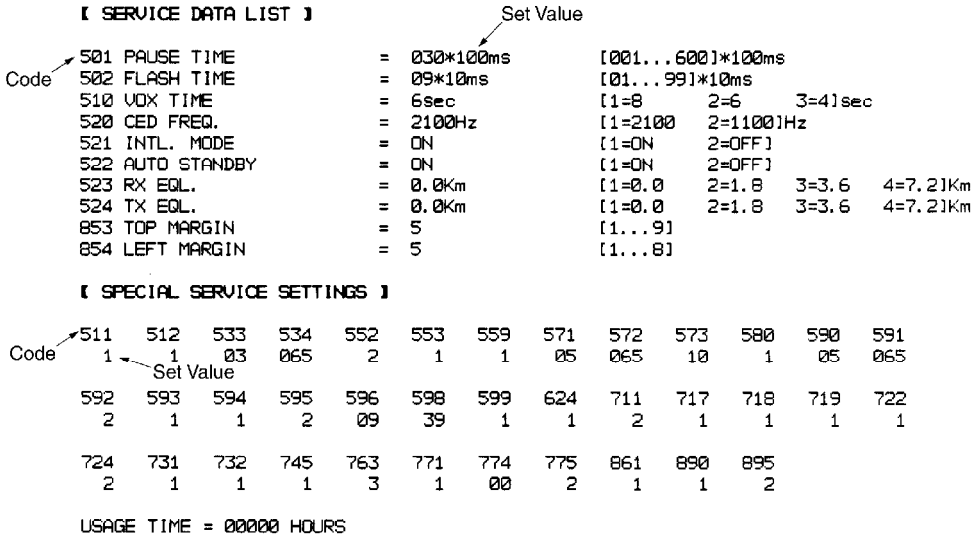
2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)

2.4.5.1. KX-FM189BL

```
        [ SERVICE DATA LIST ]                    Set Value
Code
        501 PAUSE TIME              =  030*100ms      [001...600]*100ms
        502 FLASH TIME              =  12*10ms        [01...99]*10ms
        510 VOX TIME                =  6sec           [1=8     2=6     3=4]sec
        520 CED FREQ.               =  2100Hz         [1=2100  2=1100]Hz
        521 INTL. MODE              =  ON             [1=ON    2=OFF]
        522 AUTO STANDBY            =  ON             [1=ON    2=OFF]
        523 RX EQL.                 =  0.0Km          [1=0.0   2=1.8   3=3.6   4=7.2]Km
        524 TX EQL.                 =  0.0Km          [1=0.0   2=1.8   3=3.6   4=7.2]Km
        853 TOP MARGIN              =  5              [1...9]
        854 LEFT MARGIN             =  5              [1...8]

        [ SPECIAL SERVICE SETTINGS ]

Code
        511   512   533   534   552   553   559   571   572   573   575   580   590
          1     1    03   065     2     1     1    05   065    10     1     1    05
                Set Value
        591   592   593   594   595   596   598   599   624   711   717   718   719
        065     2     1     1     2    09    39     1     1     2     1     1     1

        722   724   731   732   745   763   771   774   775   861   890   895
          1     2     1     1     1     3     1    00     2     1     1     2

        USAGE TIME = 00000 HOURS
```

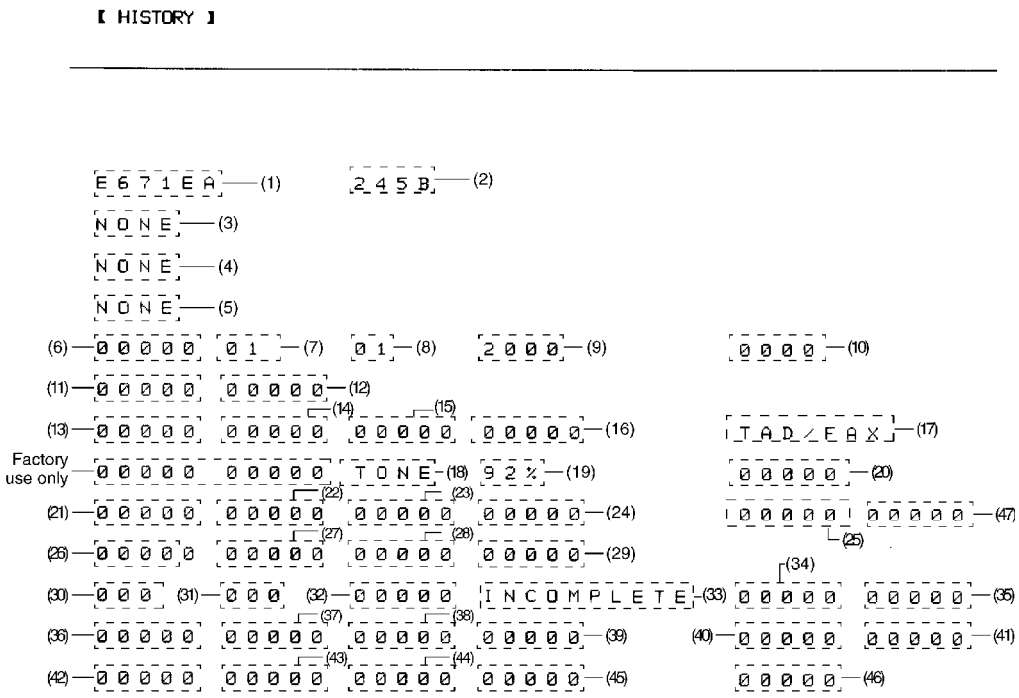
Note:
The above values are the default values.

2.4.5.2. KX-FM189S



Note:
The above values are the default values.

2.4.6. HISTORY



Note:
See the following descriptions of this report. Item No. (1) ~ (47) are corresponding to the listed items in DESCRIPTIONS OF THE HISTORY REPORT().

2.4.6.1. DESCRIPTIONS OF THE HISTORY REPORT

(1) ROM VERSION
EPROM version
(2) SUM
EPROM internal data calculation.
(3) YOUR LOGO
The user logo recorded in the unit. If it is not recorded, NONE will be displayed.

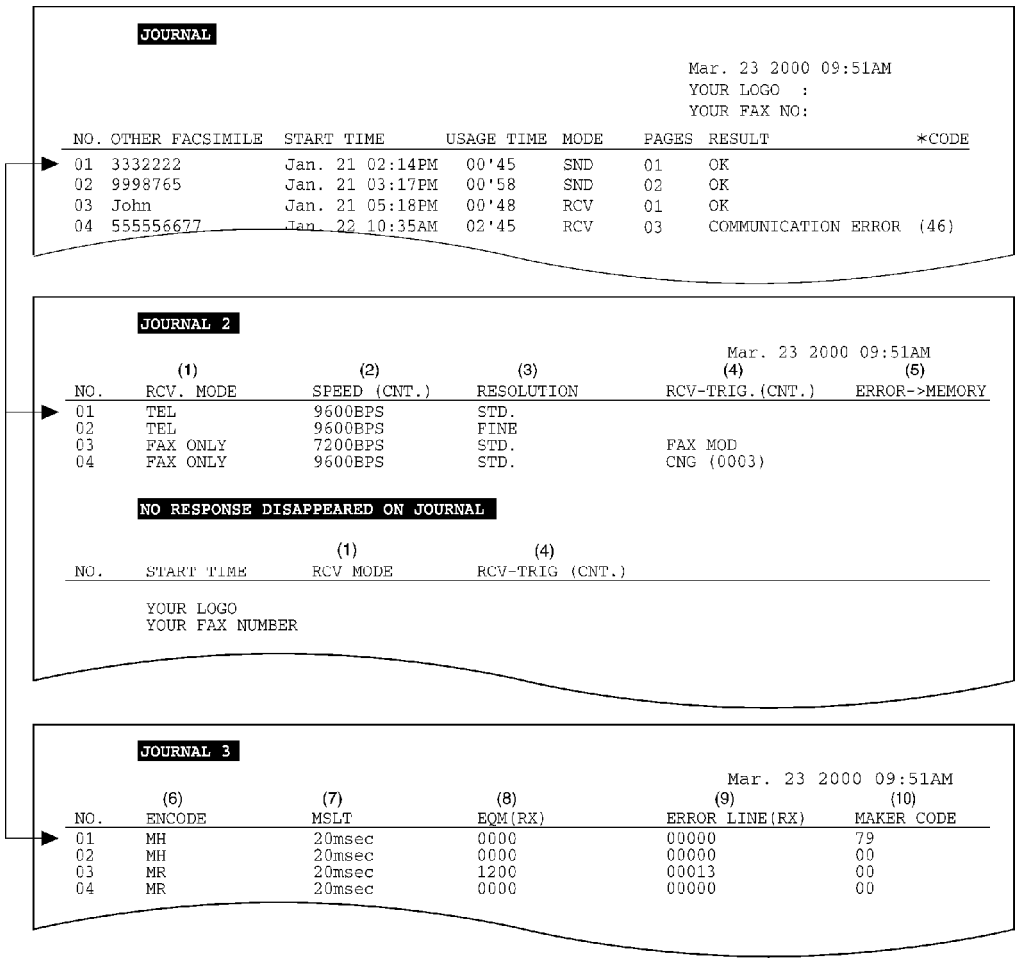
(4) YOUR TELEPHONE NUMBER
The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.
(5) FAX PAGER NUMBER
If you program a pager number into the unit, the pager number will be displayed here.
(6) FACTORY - CUSTOMER
This shows how many days from factory production until the user turns ON the unit.
(7) MONTH
The shows the very first month, date, year and time set by the user after they purchased the unit.
(8) DAY
The shows the very first month, date, year and time set by the user after they purchased the unit.
(9) YEAR
The shows the very first month, date, year and time set by the user after they purchased the unit.
(10) TIME
The shows the very first month, date, year and time set by the user after they purchased the unit.
(11) USAGE TIME
The amount of time the unit has been powered ON.
(12) FACTORY - NOW
This shows how many days from factory production until the user prints out this history list.
(13) TEL MODE
The amount of time the TEL mode setting was used.
(14) FAX MODE
The amount of time the FAX mode setting was used.
(15) TEL/FAX MODE
The amount of time the TEL/FAX mode setting was used.
(16) ANS/FAX MODE
The amount of time the ANS/FAX mode setting was used.
(17) FINAL RECEIVE MODE
The last set receiving mode by the user.
(18) TONE/PULSE SELECTION
The most recently used setting used, either TONE or PULSE.
(19) RECEIVE REDUCTION
The compression rate when receiving.
(20) SETTING NO. OF DIRECTORY
The recorded directory stations (one touch and EASY DIAL).
(21) NUMBER OF COPY
The number of pages copied.
(22) NUMBER OF RECEIVE
The number of pages received.
(23) NUMBER OF SENDING
The number of pages sent.
(24) NUMBER OF CALLER ID
The number of times Caller ID was received.
(25) NUM(BER OF RECORDING MESSAGE
The number of messages recorded in TAM.
(26) NUMBER OF PC SCAN
The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)
(27) NUMBER OF PC-PRINT
The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) NUMBER OF RECEIVING TO PC
The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)
(29) NUMBER OF SENDING FROM PC
The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)
(30) NUMBER OF PRINTING WARNING LIST
The number of warning lists printed until now.
(31) NUMBER OF PRINTING HELP
The number of help lists printed until now.
(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION
The number of faxes received that were divided into more than one sheet since the unit was purchased.
(33) DETECTION OF RS232C
When the fax and PC serial cable (RS232C) are connected and the signal is received correctly, COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed. (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)
(34) Not Used
(35) Not Used
(36) FAX MODE
Means the unit received a fax message in the FAX mode.
(37) MAN RCV
Means the unit received a fax message by manual operation.
(38) FRN RCV
Means the unit received a fax message by friendly signal detection.
(39) VOX
Means the unit detected silence or no voice.
(40) RMT DTMF
Means the unit detected DTMF (Remote Fax activation code) entered remotely.
(41) PAL DTMF
Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
(42) TURN-ON
Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
(43) TIME OUT
Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
(44) IDENT
Means the unit detected Ring Detection.
(45) CNG OGM
Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode. Or means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.
(46) CNG ICM
Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.
(47) Not Used

2.4.7. SPECIAL SERVICE JOURNAL REPORTS

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882.

Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to REMOTE PROGRAMMING().) The JOURNAL report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).



JOURNAL

Mar. 23 2000 09:51AM
YOUR LOGO :
YOUR FAX NO:

NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	3332222	Jan. 21 02:14PM	00'45	SND	01	OK	
02	9998765	Jan. 21 03:17PM	00'58	SND	02	OK	
03	John	Jan. 21 05:18PM	00'48	RCV	01	OK	
04	555556677	Jan. 22 10:35AM	02'45	RCV	03	COMMUNICATION ERROR (46)	

JOURNAL 2

Mar. 23 2000 09:51AM

NO.	(1) RCV. MODE	(2) SPEED (CNT.)	(3) RESOLUTION	(4) RCV-TRIG.(CNT.)	(5) ERROR->MEMORY
01	TEL	9600BPS	STD.		
02	TEL	9600BPS	FINE		
03	FAX ONLY	7200BPS	STD.	FAX MOD	
04	FAX ONLY	9600BPS	STD.	CNG (0003)	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	(1) RCV MODE	(4) RCV-TRIG (CNT.)

YOUR LOGO
YOUR FAX NUMBER

JOURNAL 3

Mar. 23 2000 09:51AM

NO.	(6) ENCODE	(7) MSLT	(8) EQM(RX)	(9) ERROR LINE(RX)	(10) MAKER CODE
01	MH	20msec	0000	00000	79
02	MH	20msec	0000	00000	00
03	MR	20msec	1200	00013	00
04	MR	20msec	0000	00000	00

HOW TO READ JOURNAL REPORTS:
Example:

1. **Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the JOURNAL 3. You can get the following information.**
   *** MODE: Fax transmission / * RCV. MODE: TEL / * TX SPEED: 9.6 kbps / * RESOLUTION: standard / * ENCODE: MH / * MAKER CODE: 79**
2. **Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.**

For further details, see JOURNAL 2() and JOURNAL 3().

2.4.7.1. JOURNAL 2

Refer to JOURNAL 2 in PRINTOUT EXAMPLE().
Journal 2 displays the additional detailed information about the last 35 communications.
Descriptions:
(1) RCV. MODE
Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.
(2) SPEED
Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.
(3) RESOLUTION
Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.
(4) RCV-TRIG. (CNT.)
Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in PRINTOUT EXAMPLE(). The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	VOX	Means the unit detected silence or no voice.
5	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
6	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
7	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
8	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL /FAX mode.
9	IDENT	Means the unit detected Ring Detection.
10	CNG OGM	Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode. / OR / Means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.
11	CNG ICM	Means the unit detected the CNG while it was recording the ICM in the ANS/ FAX mode.

(5) ERROR → MEMORY
Indicates the reason why the unit received a fax message in memory.
If you look at No.11 in the JOURNAL 2 in PRINTOUT EXAMPLE(), it shows the fax message was received in memory due to "PAPER OUT" error.
[NO RESPONSE DISAPPEARED ON JOURNAL]
The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10

communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)
When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, "No response" will be printed.

2.4.7.2. JOURNAL 3

Refer to JOURNAL 3 in PRINTOUT EXAMPLE().
Descriptions:
(6) ENCODE
Compression Code: MH/MR/MMR
(7) MSLT
MSLT means Minimum Scan Line Time. Used only at the factory.
(8) EQM
EQM means Eye Quality Monitor. Used only at the factory.
(9) ERROR LINE(RX)
When an error occurs while receiving a fax, this shows the number of error lines.
(10) MAKER CODE
This shows a 2 digit code of the other party's fax machine brand.
0E: "KX" model
00: Unknown
79: "UF" model
19: "Xerox" model

2.4.7.3. PRINTOUT EXAMPLE

JOURNAL2

Mar. 25 2000 01:59PM

NO.	RCV. MODE	SPEED (CNT.)	RESOLUTION	RCV-TRIG. (CNT.)	ERROR->MEMORY
01	FAX ONLY	9600BPS	FINE.	FAX MOD	
02	FAX ONLY	9600BPS	STD.	FAX MOD	
03	FAX ONLY	9600BPS	FINE.		
04	FAX ONLY	9600BPS	FINE.	FAX MOD	
05	FAX ONLY	9600BPS	FINE.	FAX MOD	
06	FAX ONLY	9600BPS	FINE.	FAX MOD	
07	FAX ONLY	9600BPS	FINE.		
08	FAX ONLY	9600BPS	FINE.		
09	FAX ONLY	9600BPS	FINE.		
10	FAX ONLY	9600BPS	STD.	FAX MOD	
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT
12	FAX ONLY	9600BPS	STD.	FAX MOD	
13	FAX ONLY	9600BPS	STD.		
14	FAX ONLY	?	?		
15	FAX ONLY	?	?		
16	FAX ONLY	?	?		
17	FAX ONLY	9600BPS	STD.		
18	FAX ONLY	9600BPS	FINE.	FAX MOD	
19	FAX ONLY	9600BPS	STD.	FAX MOD	
20	FAX ONLY	9600BPS	S-FINE.		
21	FAX ONLY	9600BPS	FINE.		
22	FAX ONLY	9600BPS	FINE.	FAX MOD	
23	FAX ONLY	?	?	FAX MOD	
24	FAX ONLY	9600BPS	STD.	FAX MOD	
25	FAX ONLY	9600BPS	STD.	FAX MOD	
26	FAX ONLY	9600BPS	FINE.	FAX MOD	
27	FAX ONLY	9600BPS	FINE.		
28	FAX ONLY	9600BPS	STD.	FAX MOD	
29	FAX ONLY	9600BPS	FINE.	FAX MOD	
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD	
31	FAX ONLY	9600BPS	STD.	FAX MOD	
32	FAX ONLY	9600BPS	STD.	FAX MOD	
33	FAX ONLY	?	?	FAX MOD	
34	FAX ONLY	9600BPS	STD.	FAX MOD	
35	FAX ONLY	9600BPS	STD.	FAX MOD	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV MODE	RCV-TRIG. (CNT.)

JOURNAL3

Mar. 25 2000 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

2.5. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test mode	Type of Mode	Code □□□ Operation after code input	Function
MOTOR TEST	Service Mode	5 5 6 START	Rotates the transmission and reception motor to check the operation of the motor. 13 ... FAX TX/Reading memory 14 ... Document feed 23 ... Recording paper is fed 33 ... List/FAX RX print, pull back recording paper 43 ... Copy 05 ... Recording paper feed (Test a recording paper feeding operation by shifting from 23 to 33.) • Press the STOP button to quit.
MODEM TEST	Service Mode	5 5 4 START	Telephone line circuit is connected automatically, output the following signals on the circuit line. 1) OFF → 2)14400bps → 3)12000bps → 4) 9600bps (V17) → 5) 7200bps (V17) → 6) 9600bps → 7) 7200bps → 8) 4800bps → 9)2400bps → 10) 300bps → 11) 2100Hz → 12)1100Hz
ROM CHECK	Service Mode	5 5 1 START	Indicates the version and check sum of the ROM.
SCAN CHECK	Service Mode	5 5 5 START	Turns on the LEDs of the CIS and operates the read system.
LCD CHECK	Service Mode	5 5 8 START	Checks the LCD indication. Illuminates all the dots to check if they are normal.
DTMF SINGLE TEST	Service Mode	5 5 2 1..On 2..Off	Outputs DTMF as single tones. Used to check the frequencies of the individual DTMF tones. Refer to **2.5.1. DTMF SINGLE TONE TRANSMIT SELECTION**.
LED TEST	Service Mode	5 5 7 START	All LEDs above the operation panel board flash on and off, or are illuminated.
KEY CHECK	Service Mode	5 6 1 START {any key}	Checks the button operation. Indicates the button code on the LCD while the button is pressed. Refer to **2.5.2. BUTTON CODE TABLE**.
FACTORY SET	Service Mode	5 5 0 START	Clears the memory where the user can store data.
PRINT TEST PATTERN	Service Mode	8 5 2 START	Prints out the test pattern. Used mainly at the factory to test the print quality. You can select 1~4. (See **2.5.3. PRINT TEST PATTERN**.)

CROSS REFERENCE:

DTMF SINGLE TONE TRANSMIT SELECTION()

BUTTON CODE TABLE()

PRINT TEST PATTERN()

Test mode	Type of Mode	Code □□□ Operation after code input	Function
SENSOR CHECK & VOX CHECK	Service Mode	8 1 5 START LCD display Do Sn Co Pt Vx	If you enter this mode and operate sensor levers with your hands, the LCD display of the related sensor (or switch) turns ON/OFF. Also, when copying a document, the related sensor will turn ON/OFF. (Do, Sn, Pt) For each sensor's operation, refer to **6.5. SENSORS AND SWITCHES**. Do: Document set sensor: Paper inserted. Turns on when a document is inserted. Sn: Read position sensor: At the read position. Turns on when the front cover is opened and the sensor lever is pressed directly. Co: Cover open sensor: Film end sensor: Cover open or don't set the film. Turns on and off when the front cover is opened and closed. Pt: Paper top sensor: Sensor on. Turns on when the front cover is opened and the sensor lever is pressed directly. Vx: Vox signal: Detection signal for the tone on the line. Turns on when there is a tone signal on the line.
DIGITAL SPEAKERPHONE RX & TX CHECK	Service Mode	8 4 1 SPEAKERPHONE	Please refer to **2.3.9. DIGITAL SPEAKERPHONE**

Note:

The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

CROSS REFERENCE:
DIGITAL SPEAKERPHONE()
SENSORS AND SWITCHES()

2.5.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	Key	Low Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) / Low (Hz)	1209	1336	1477
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	*	"0"	"#"

Note:

After performing this check, do not forget to turn the setting off. otherwise, dialing in DTMF signal will not work.

2.5.2. BUTTON CODE TABLE

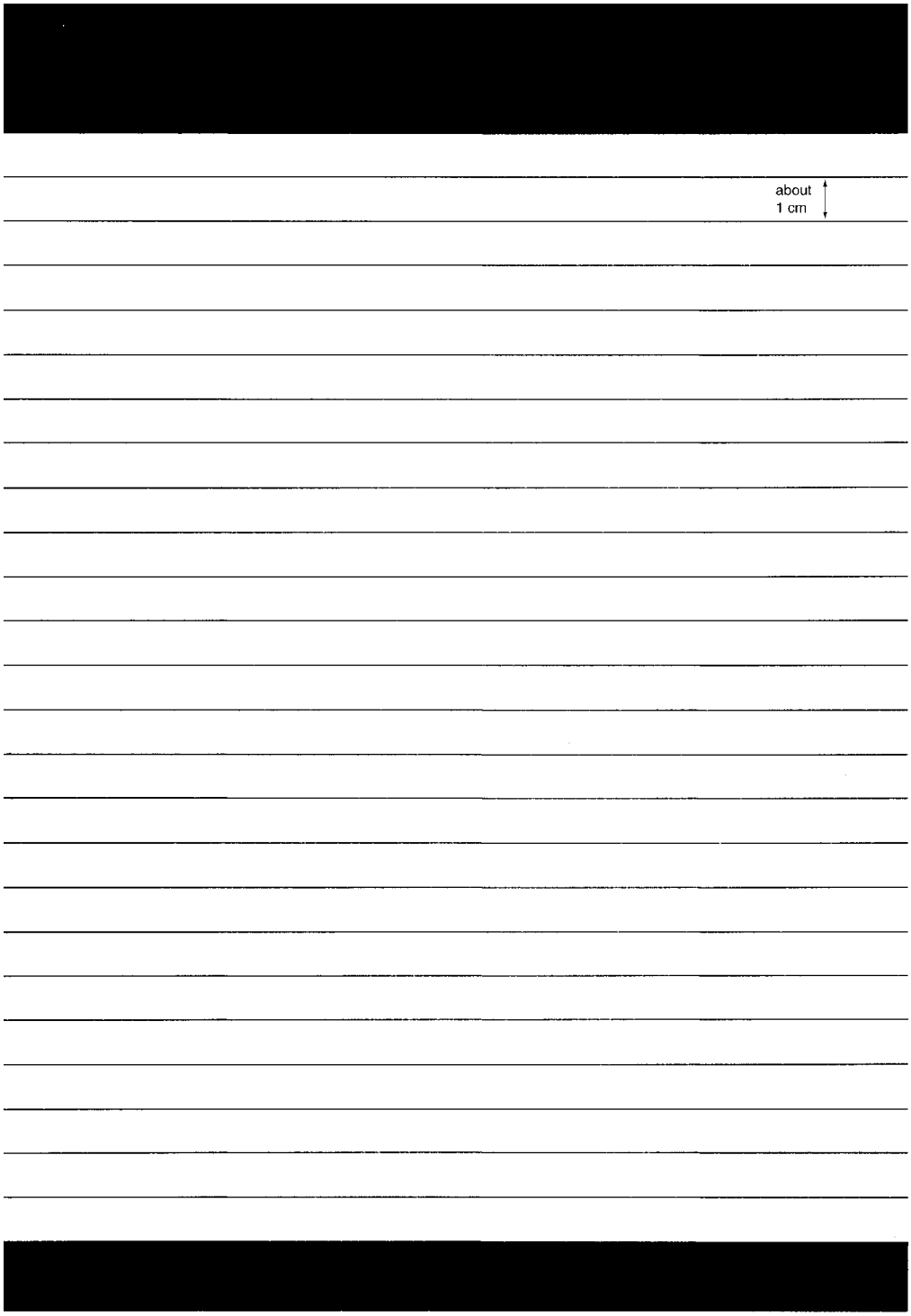
Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	25	▲ VOLUME	3B	✳
04	START/COPY/SET	26	▼ VOLUME	3C	#
05	LOWER	31	1	3D	REDIAL/PAUSE
08	SP-PHONE	32	2	3E	RECALL
0A	MUTE	33	3	47	CALLER ID
0C	AUTO ANSWER	34	4	49	QUICK SCAN
14	RECORD	35	5	1E	EASY DIAL (RIGHT)
16	ERASE	36	6	1F	EASY DIAL (LEFT)
18	PLAY MESSAGE	37	7	4A	COLLATE
20	MENU	38	8	00	NO INPUT
22	HELP	39	9	01	STOP
24	DIRECTORY	3A	0		

Note:
Refer to BUTTON NAME (for KX-FM189S)().

2.5.3. PRINT TEST PATTERN

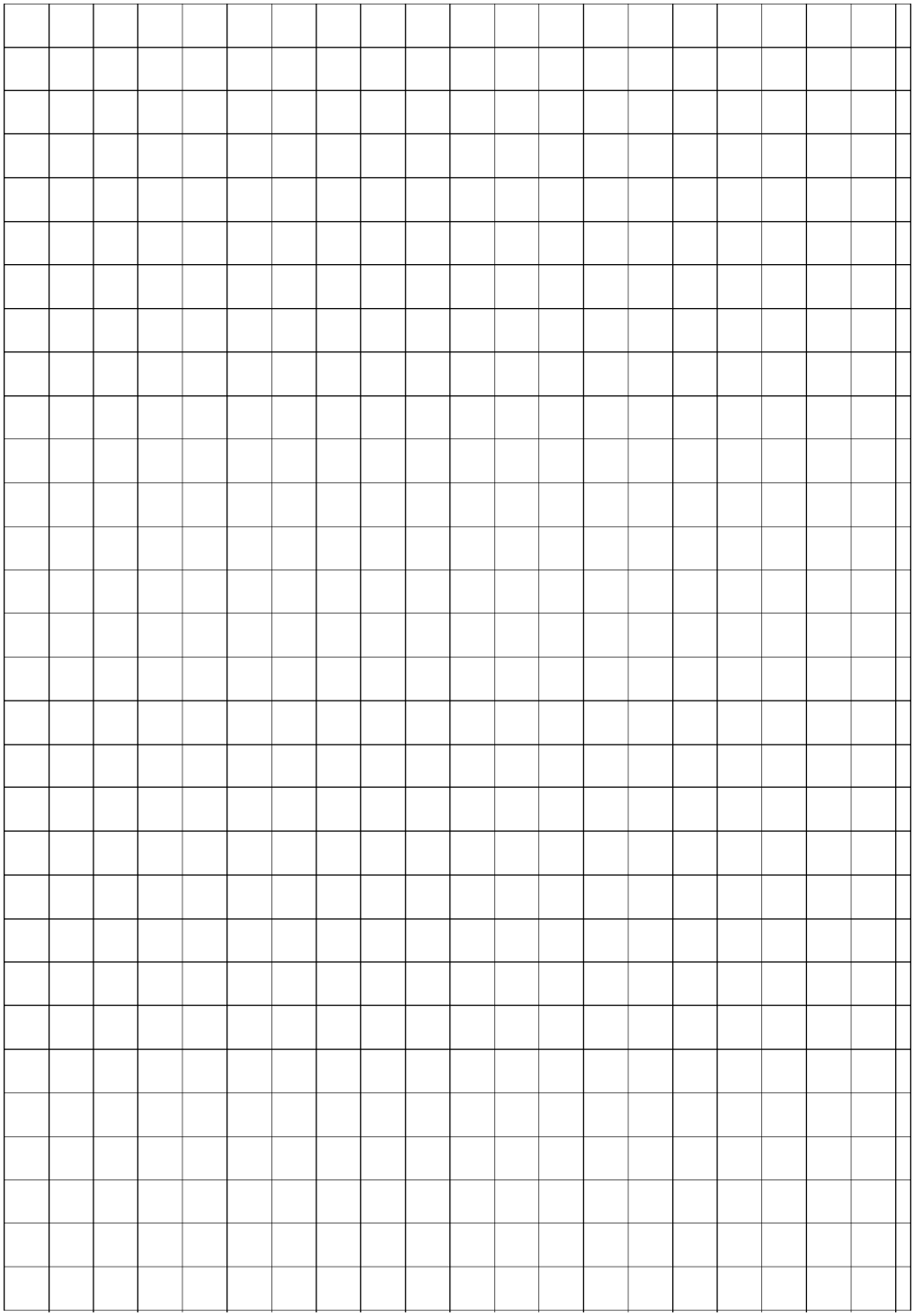
1. Platen roller

(Reference pattern)



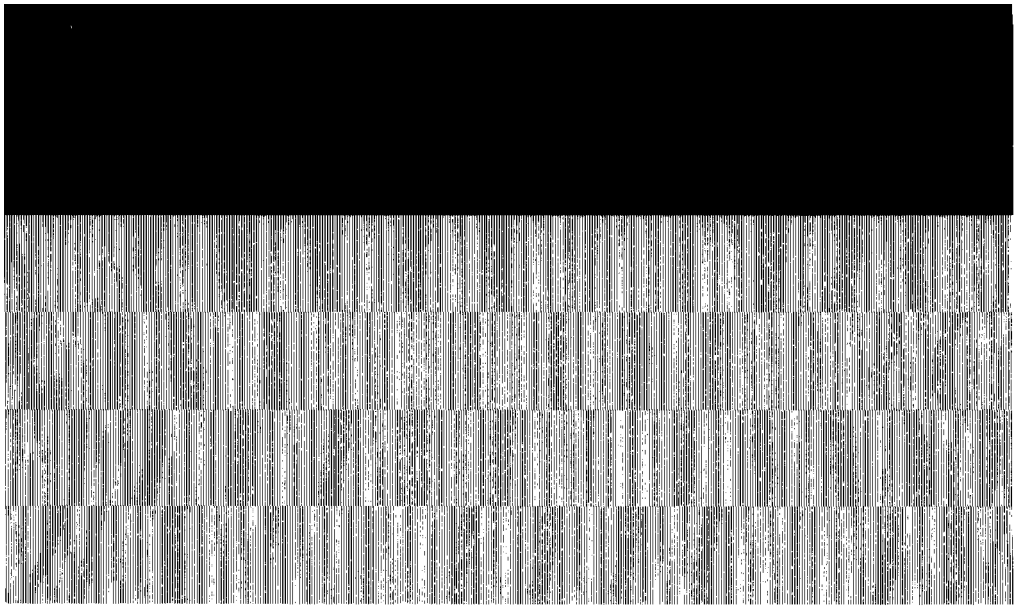
2. Left margin/Top margin

(Reference pattern)



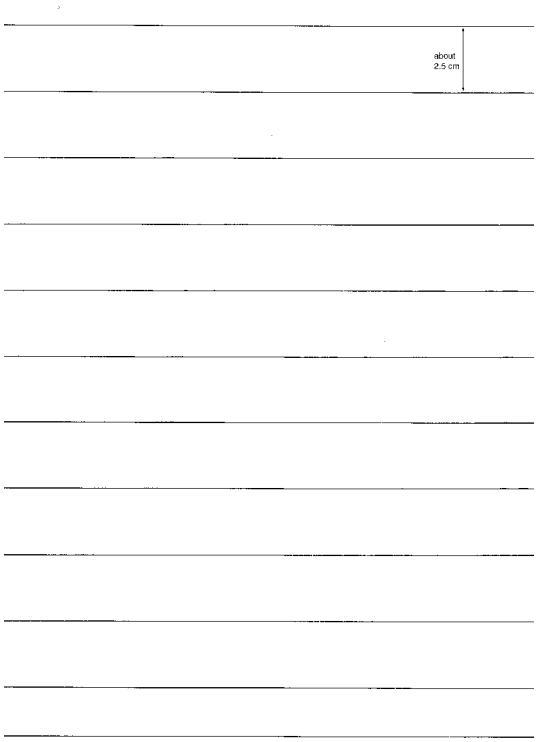
3. Thermal head 1 dot

(Reference pattern)



4. Use this test pattern to confirm the torque limiter for Ink film and platen roller timing.

(Reference pattern)



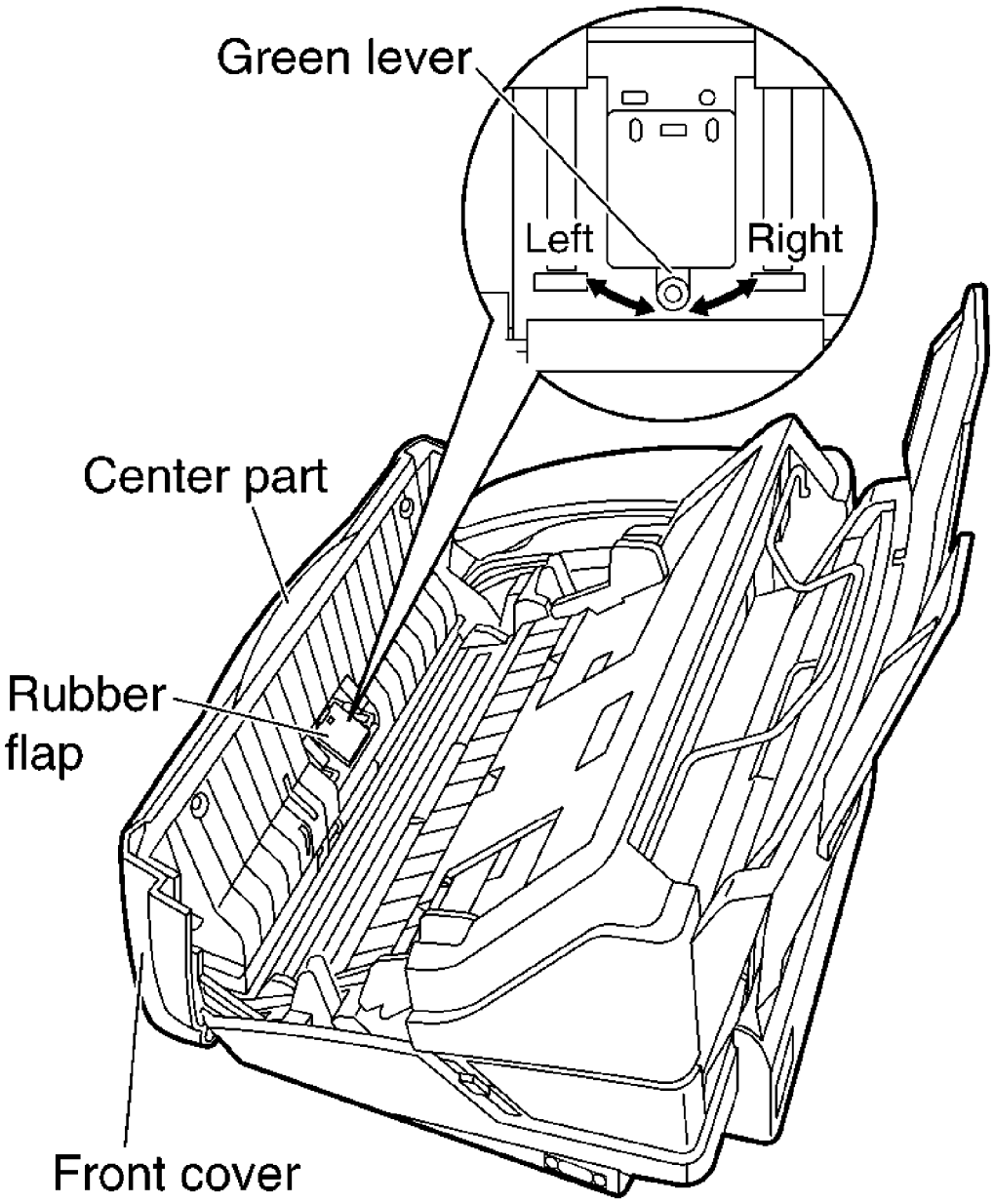
3. ADJUSTMENTS

3.1. ADJUSTING THE FEEDER PRESSURE

If misfeeding of a document such as multiple feeding or no feeding occurs frequently, try to

adjust the feeder pressure by following the steps below.

1. **Open the front cover by pulling up the center part.**
2. **Shift the position of the green lever by using an instrument with a pointed end, such as a paper clip.**
   Left: When documents multiple feed.
   Center: Standard position (pre-selected)
   Right: When documents do not feed.
3. **Close the front cover securely.**



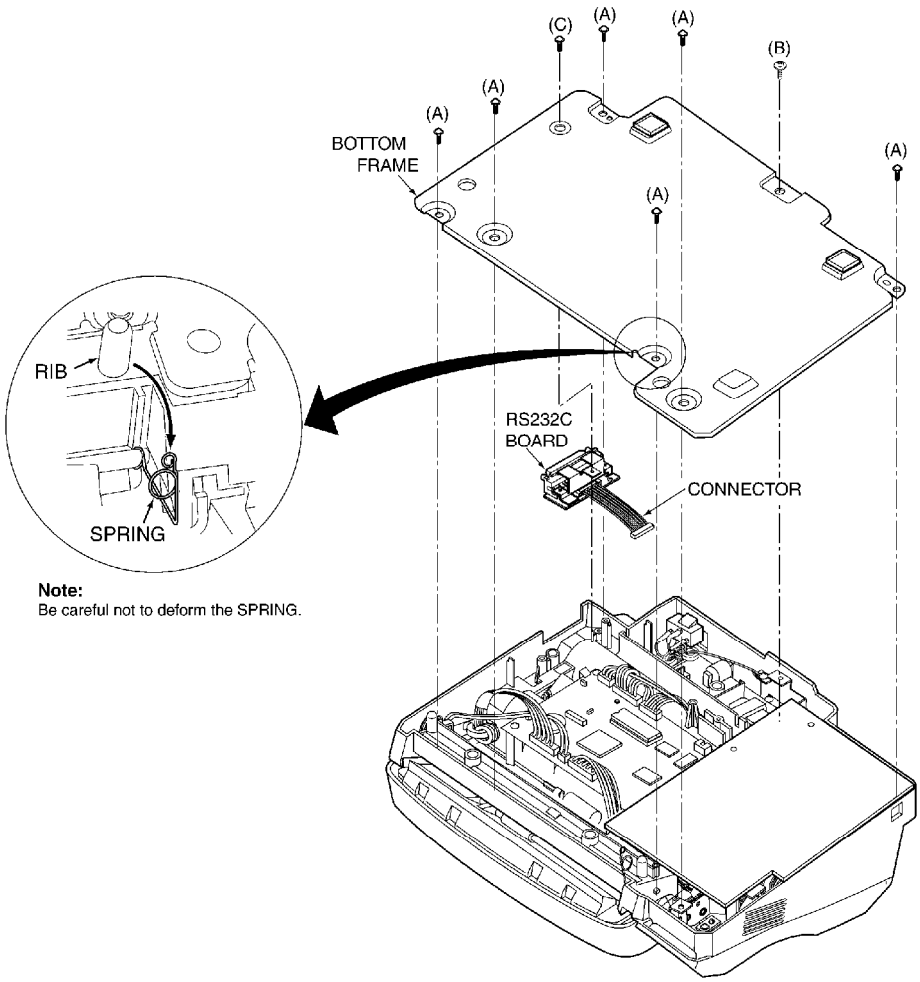
4. DISASSEMBLY INSTRUCTIONS

4.1. HOW TO REMOVE THE BOTTOM FRAME AND RS232C BOARD

Procedure: 1

REF No. 1

1) Remove the 6 screws (A).
2) Remove the 1 screw (B).
3) Remove the 1 screw (C).
4) Remove the SPRING from the RIB.
5) Remove the BOTTOM FRAME.
6) Remove the CONNECTOR.
7) Remove the RS232C BOARD.



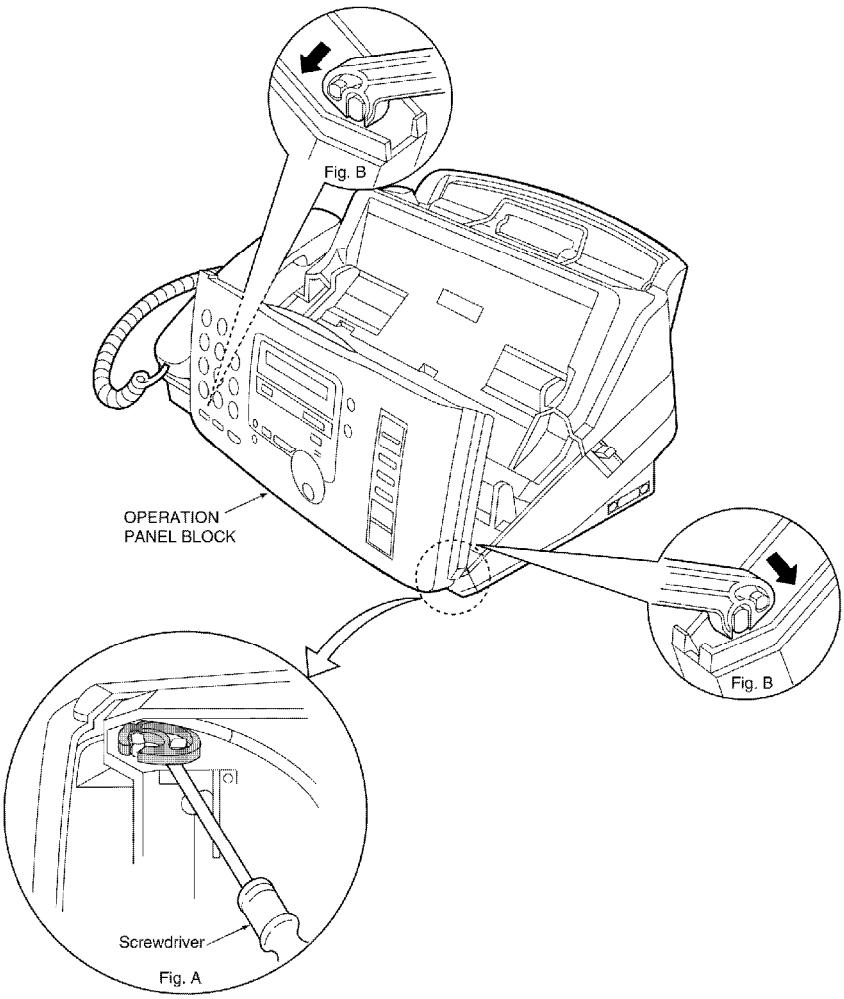
Note:
Be careful not to deform the SPRING.

4.2. HOW TO REMOVE THE OPERATION PANEL BLOCK

Procedure: 1-->2

REF No. 2

1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK.
2) Open the OPERATION PANEL BLOCK by pulling up the center part.
3) Tilt the unit vertically so that its left side faces down the grey-shaded ARM as illustrated in Fig. A, insert a screwdriver and unlatch the ARM as illustrated in Fig. A.
4) Pull out both sides of the arms (in the direction of the arrow shown in Fig. B).
5) Remove the OPERATION PANEL BLOCK.

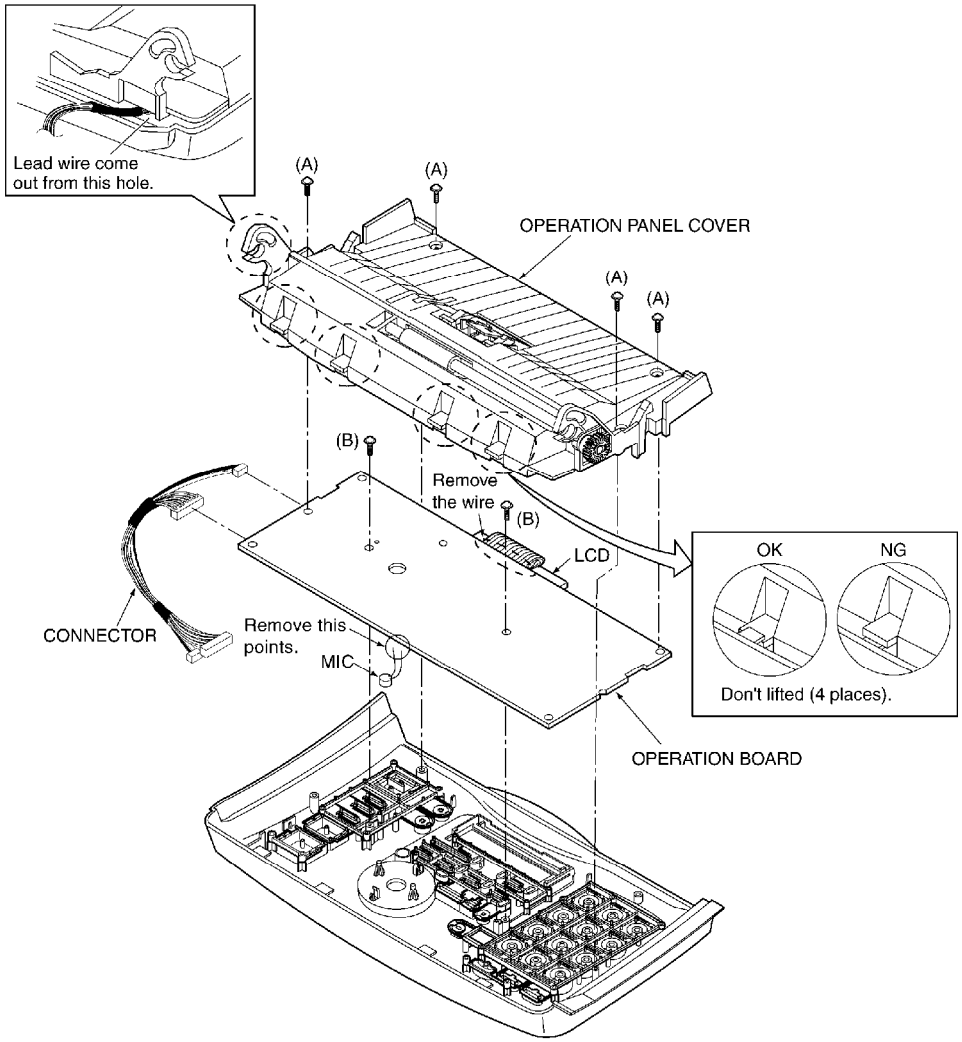


4.3. HOW TO REMOVE THE OPERATION BOARD AND LCD

Procedure: 1-->2-->3

REF No. 3

1) Remove the 4 screws (A).
2) Remove the OPERATION PANEL COVER.
3) Remove the 2 screws (B).
4) Disconnect the CONNECTOR.
5) Remove the OPERATION BOARD.
6) Remove the wire for LCD.
7) Remove the LCD.

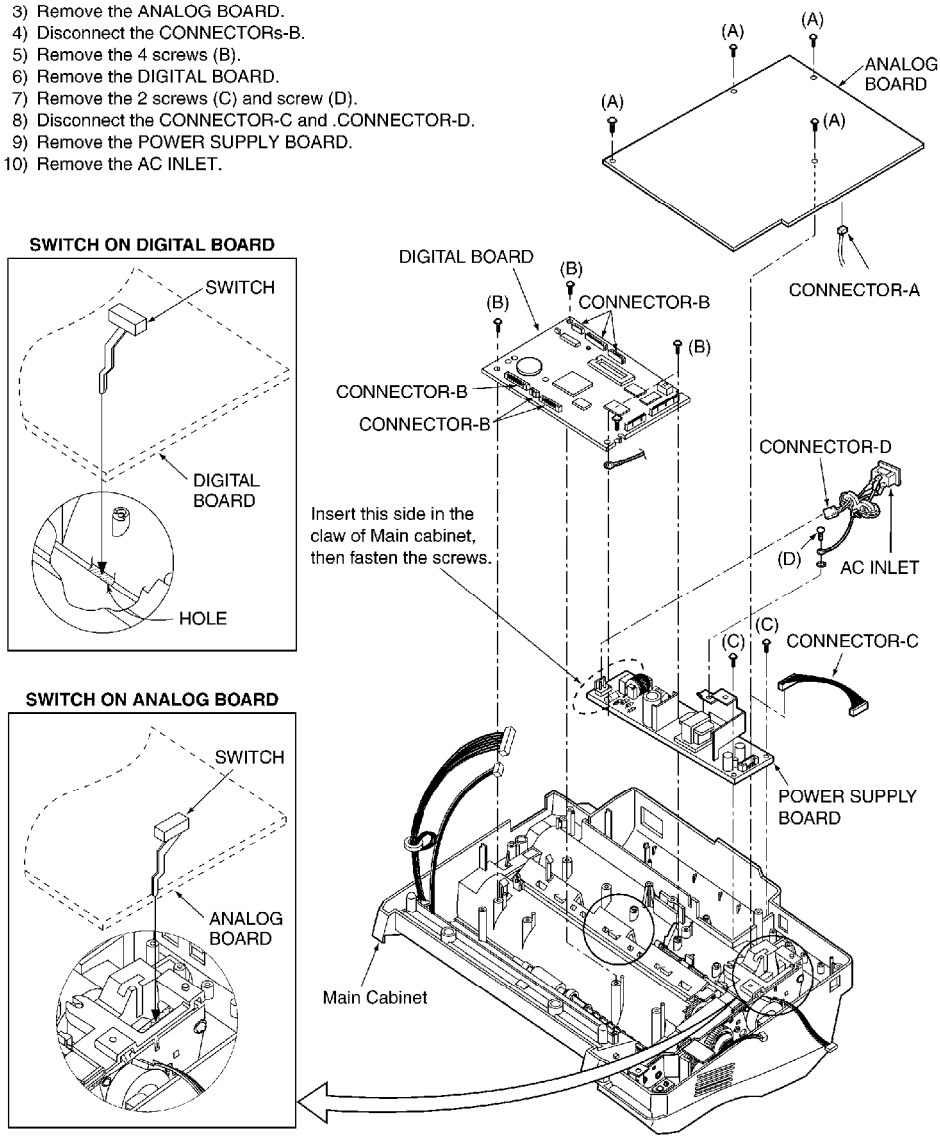


4.4. HOW TO REMOVE THE ANALOG, DIGITAL AND POWER BOARDS AND AC INLET

Procedure: 1-->4

REF No. 4

1) Remove the 4 screws (A).
2) Disconnect the CONNECTOR-A.
3) Remove the ANALOG BOARD.
4) Disconnect the CONNECTORs-B.
5) Remove the 4 screws (B).
6) Remove the DIGITAL BOARD.
7) Remove the 2 screws (C) and screw (D).
8) Disconnect the CONNECTOR-C and .CONNECTOR-D.
9) Remove the POWER SUPPLY BOARD.
10) Remove the AC INLET.

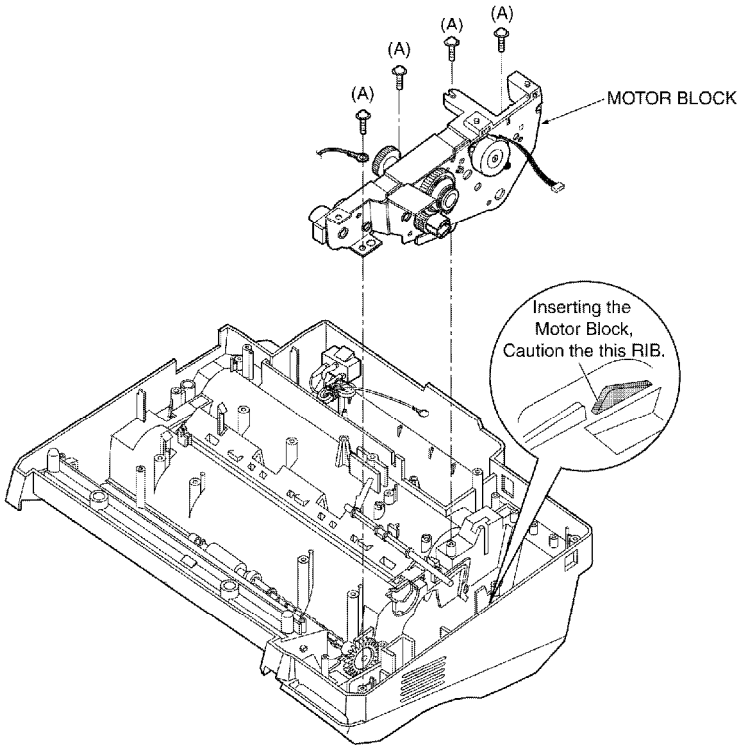


4.5. HOW TO REMOVE THE MOTOR BLOCK

Procedure: 1-->4-->5(a)

REF No. 5(a)

1) Remove the 4 screws (A).
2) Remove the MOTOR BLOCK. [See **REF No. 5(b)**]

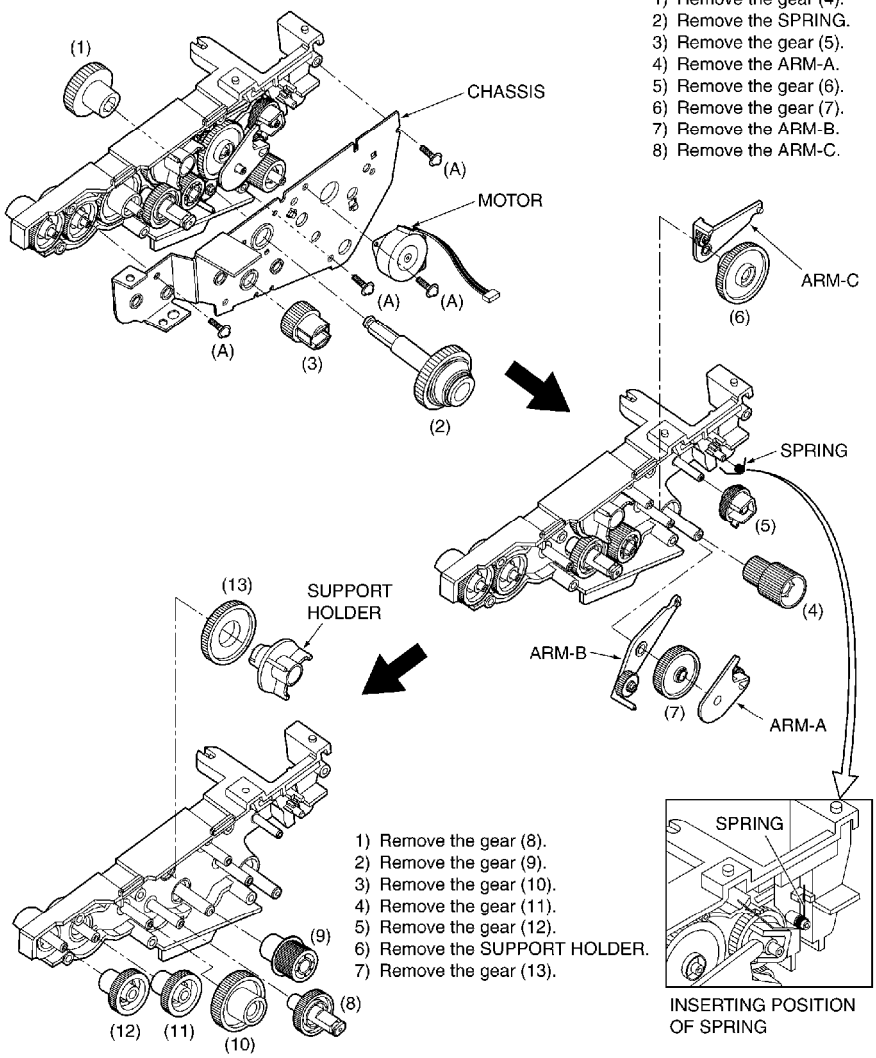


Procedure: 1-->4-->5(a)-->5(b)

REF No. 5(b)

1) Remove the 4 screws (A).
2) Remove the MOTOR and CHASSIS.
3) Remove the gear (1). (See Fig. A)
4) Remove the gear (2).
5) Remove the gear (3). (See Fig. B)

1) Remove the gear (4).
2) Remove the SPRING.
3) Remove the gear (5).
4) Remove the ARM-A.
5) Remove the gear (6).
6) Remove the gear (7).
7) Remove the ARM-B.
8) Remove the ARM-C.



1) Remove the gear (8).
2) Remove the gear (9).
3) Remove the gear (10).
4) Remove the gear (11).
5) Remove the gear (12).
6) Remove the SUPPORT HOLDER.
7) Remove the gear (13).

INSERTING POSITION OF SPRING

4.6. HOW TO REMOVE THE SEPARATION ROLLER

Procedure: 1-->4-->5(a)-->6

REF No. 6

1) Remove the SEPARATON ROLLER (Fig. A).

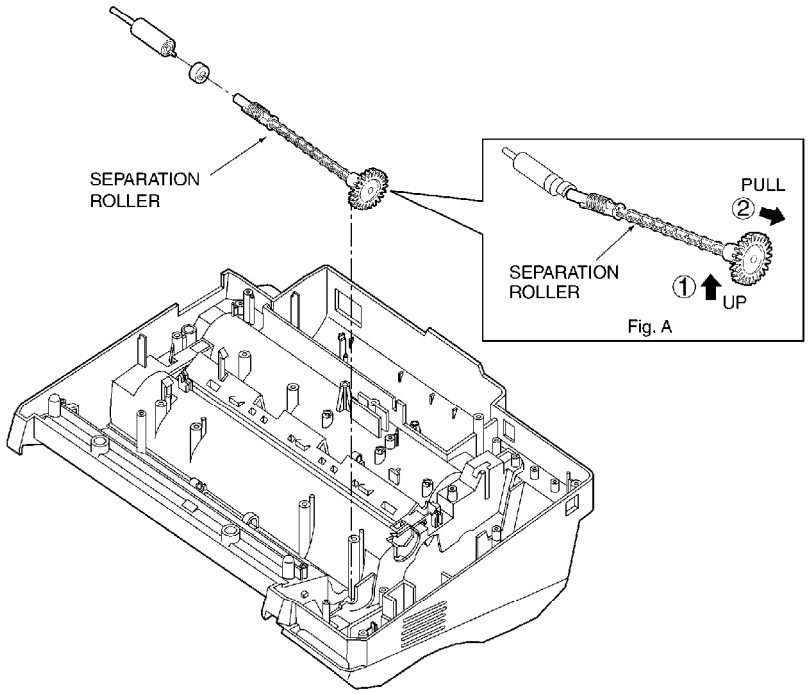


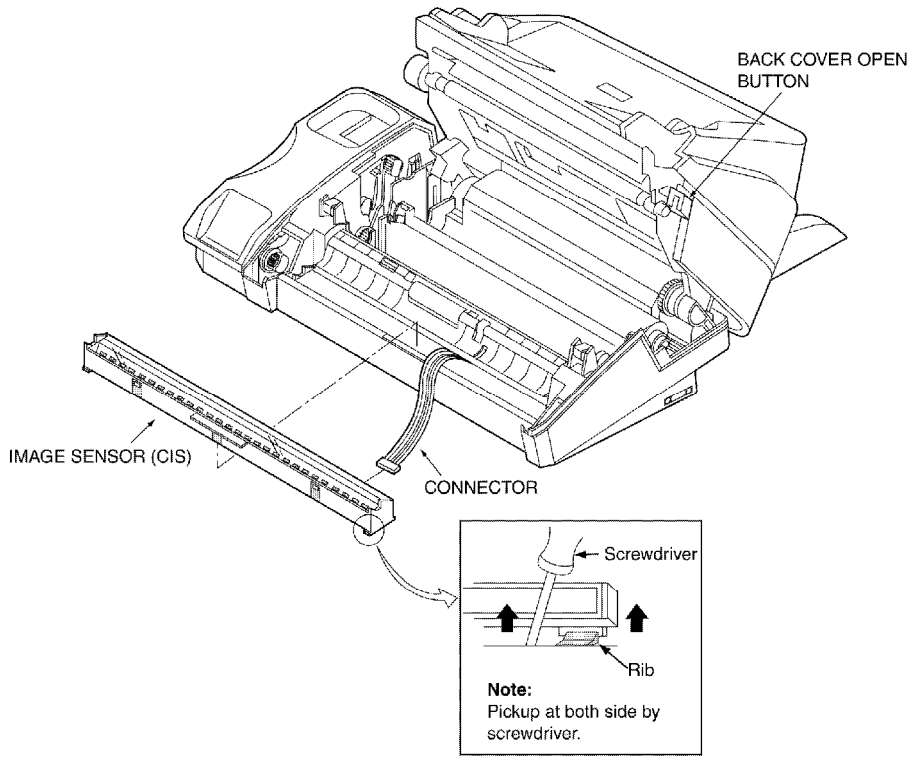
Fig. A

4.7. HOW TO REMOVE THE IMAGE SENSOR (CIS)

Procedure: 1-->2-->4-->7

REF No. 7

1) Push the BACK COVER OPEN BUTTON to open back cover.
2) Remove the CONNECTOR.
3) Remove the IMAGE SENSOR as illustrated below.



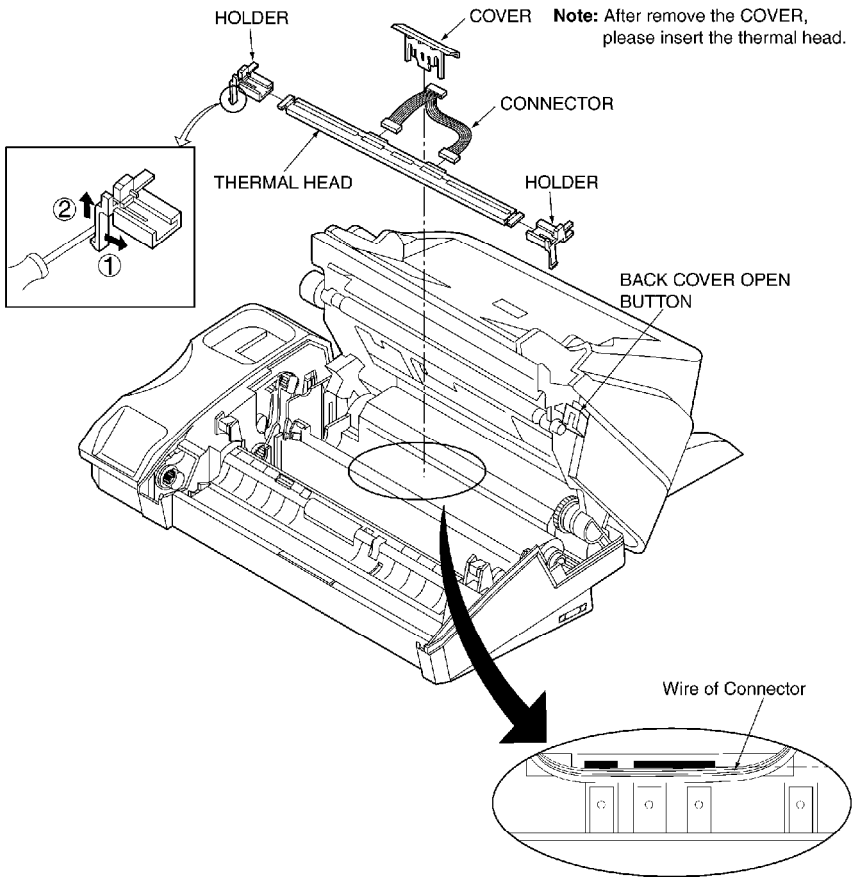
Note:
Pickup at both side by screwdriver.

4.8. HOW TO REMOVE THE TERMAL HEAD

Procedure: 1-->4-->8

REF No. 8

1) Push the BACK COVER OPEN BUTTON to open back cover.
2) Remove the 2 HOLDERs and CONNECTOR.
3) Remove the THERMAL HEAD.

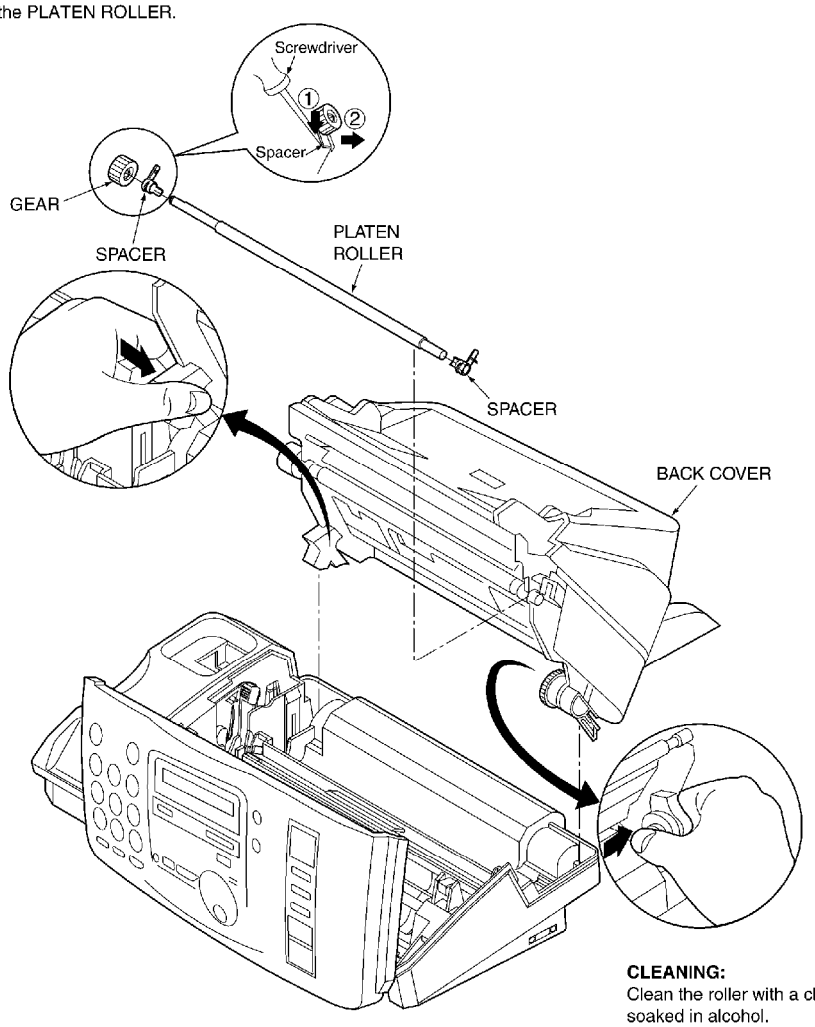


4.9. HOW TO REMOVE THE PLATEN ROLLER, BACK COVER

Procedure: 9

REF No. 9

1) Remove the FILM CARTRIDGE.
2) Push the BACK COVER OPEN BUTTON to open back cover.
3) Push the left arm (a) inside, then the BACK COVER will be stood because the stopper will be released.
4) Push both side arms of the BACK COVER to outside, then move the cover up.
5) Remove the BACK COVER.
6) Remove the 2 SPACERs from the ribs as illustrated below.
7) Remove the GEAR.
8) Remove the PLATEN ROLLER.



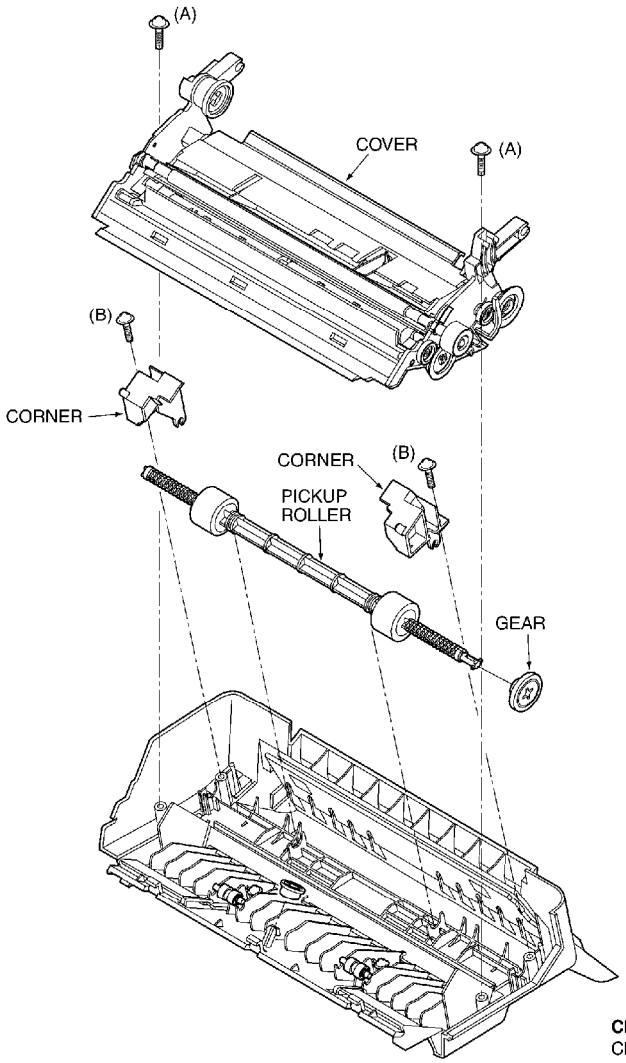
CLEANING:
Clean the roller with a cloth soaked in alcohol.

4.10. HOW TO REMOVE THE PICKUP ROLLER

Procedure: 9-->10

REF No. 10

1) Remove the 2 screws (A).
2) Remove the COVER.
3) Remove the 2 screws (B).
4) Remove the 2 CORNERs.
5) Remove the GEAR.
6) Remove the PICKUP ROLLER.



CLEANING:
Clean the roller with
a cloth soaked in alchol.

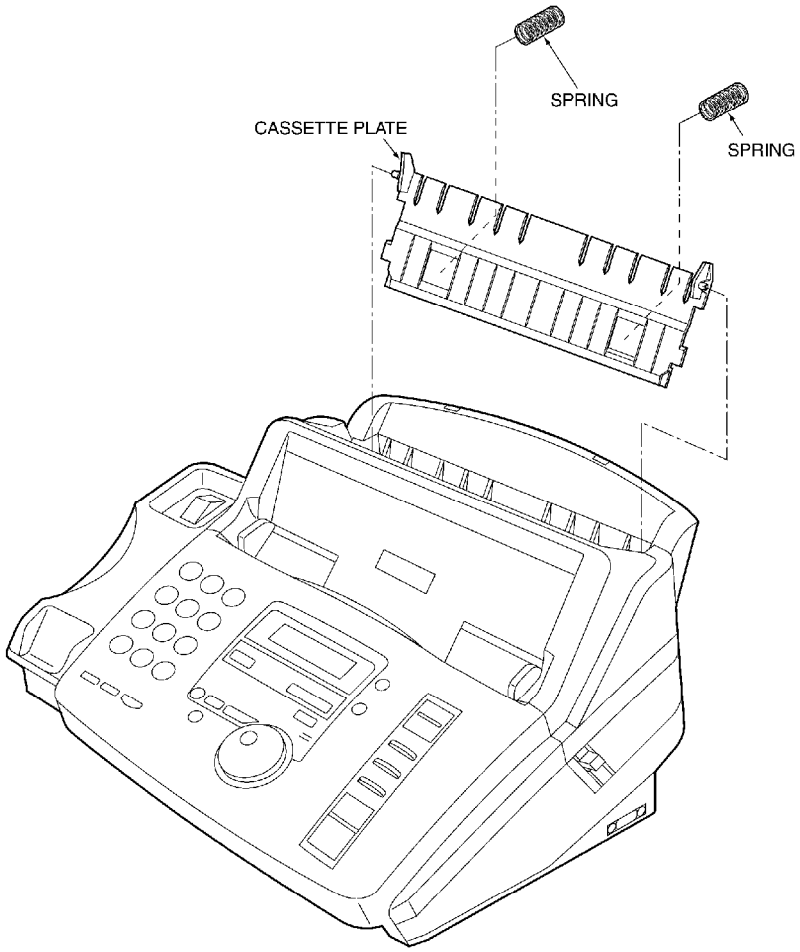
4.11. HOW TO REMOVE THE CASSETTE PLATE

Procedure: 12

REF No. 12

1) Pull up and remove the CASSETTE PLATE in the direction of the arrow.

Note: Inserting the CASSETTE PLATE the to unit, then insert the 2 SPRINGs.

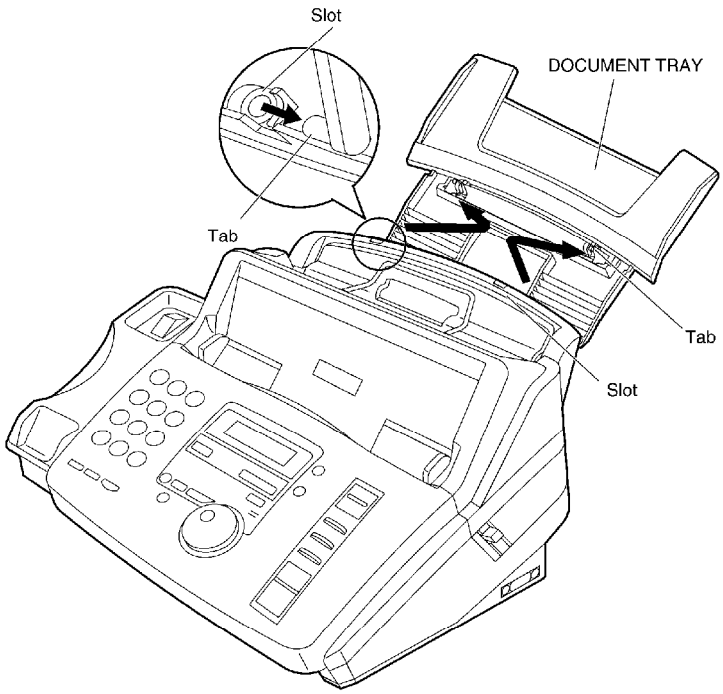


4.12. HOW TO REMOVE THE DOCUMENT TRAY

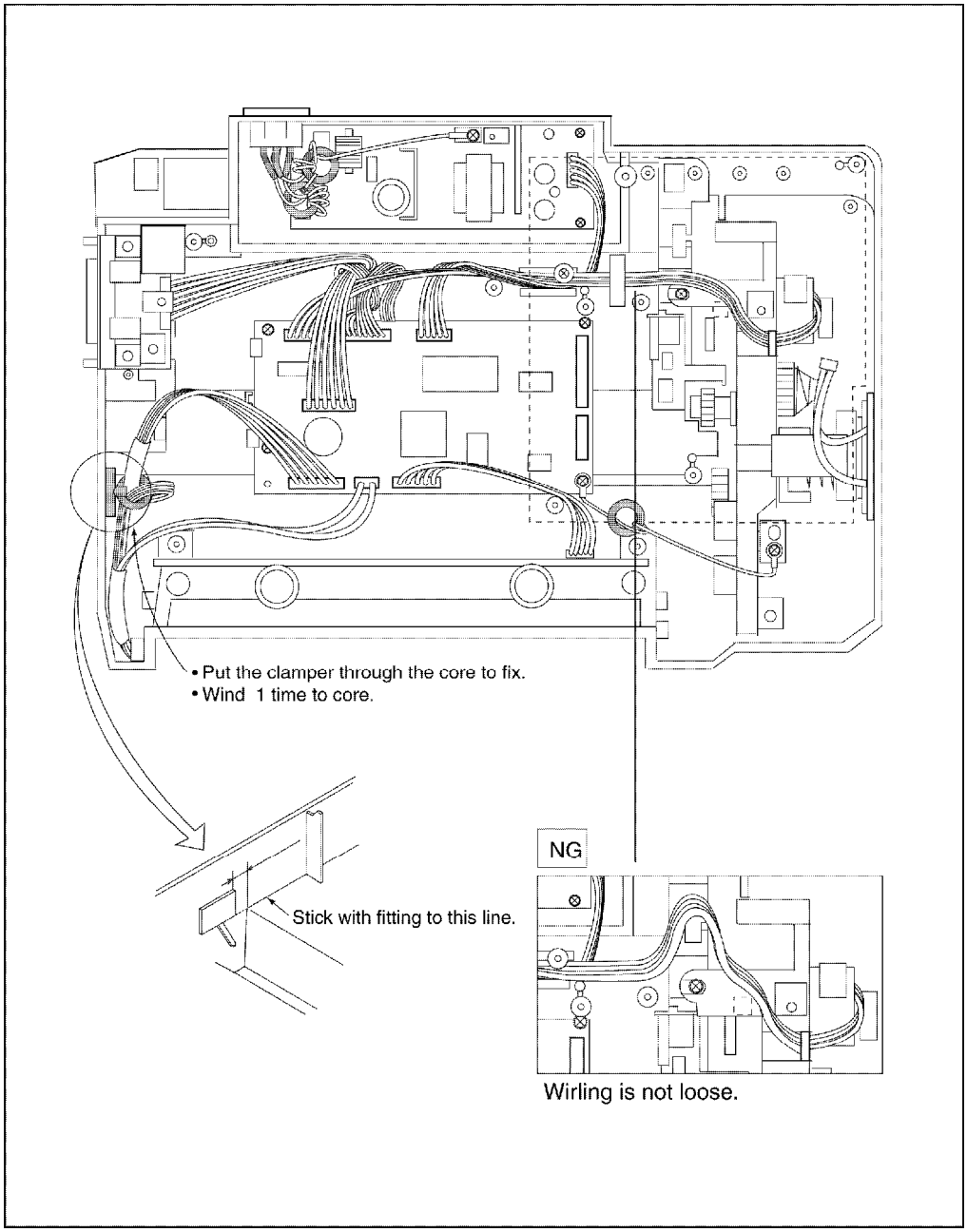
Procedure: 12

REF No. 12

1) Pull up and remove the DOCUMENT TRAY in the direction of the arrow.



4.13. INSTALLATION POSITION OF THE LEAD WIRES



5. HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

5.1. PREPARATION

- SOLDER

Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

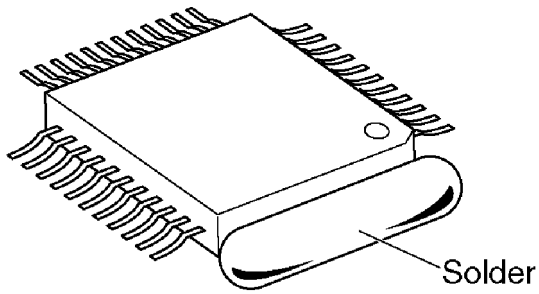
Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod 662 ± 50°F (350 ± 10°C) / (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

- Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)

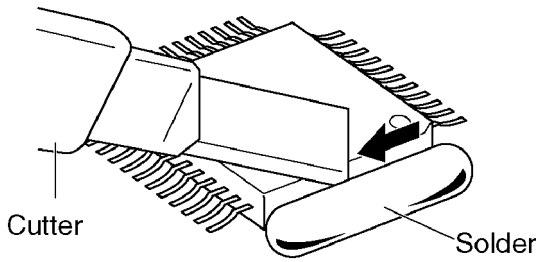
5.2. FLAT PACKAGE IC REMOVAL PROCEDURE

1. Put plenty of solder on the IC pins so that the pins can be completely covered.

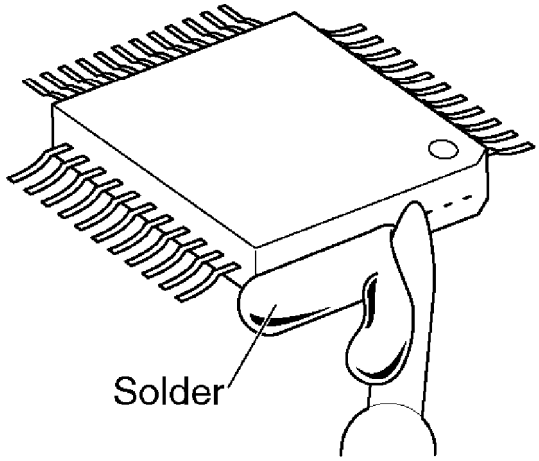
Note:
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



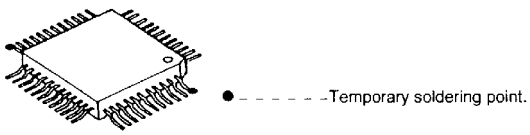
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

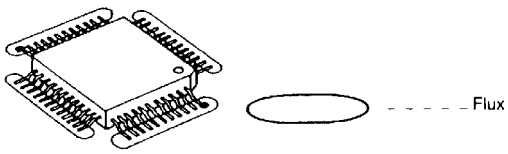
5.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

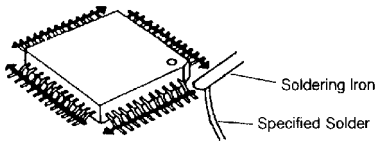


***Check the accuracy of the IC setting with the corresponding soldering foil.**

2. Apply flux to all pins of the FLAT PACKAGE IC.



3. Solder the pins, sliding the soldering iron in the direction of the arrow.

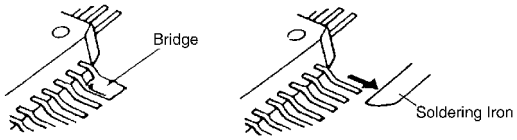


5.4. BRIDGE MODIFICATION PROCEDURE

1. Lightly resolder the bridged portion.

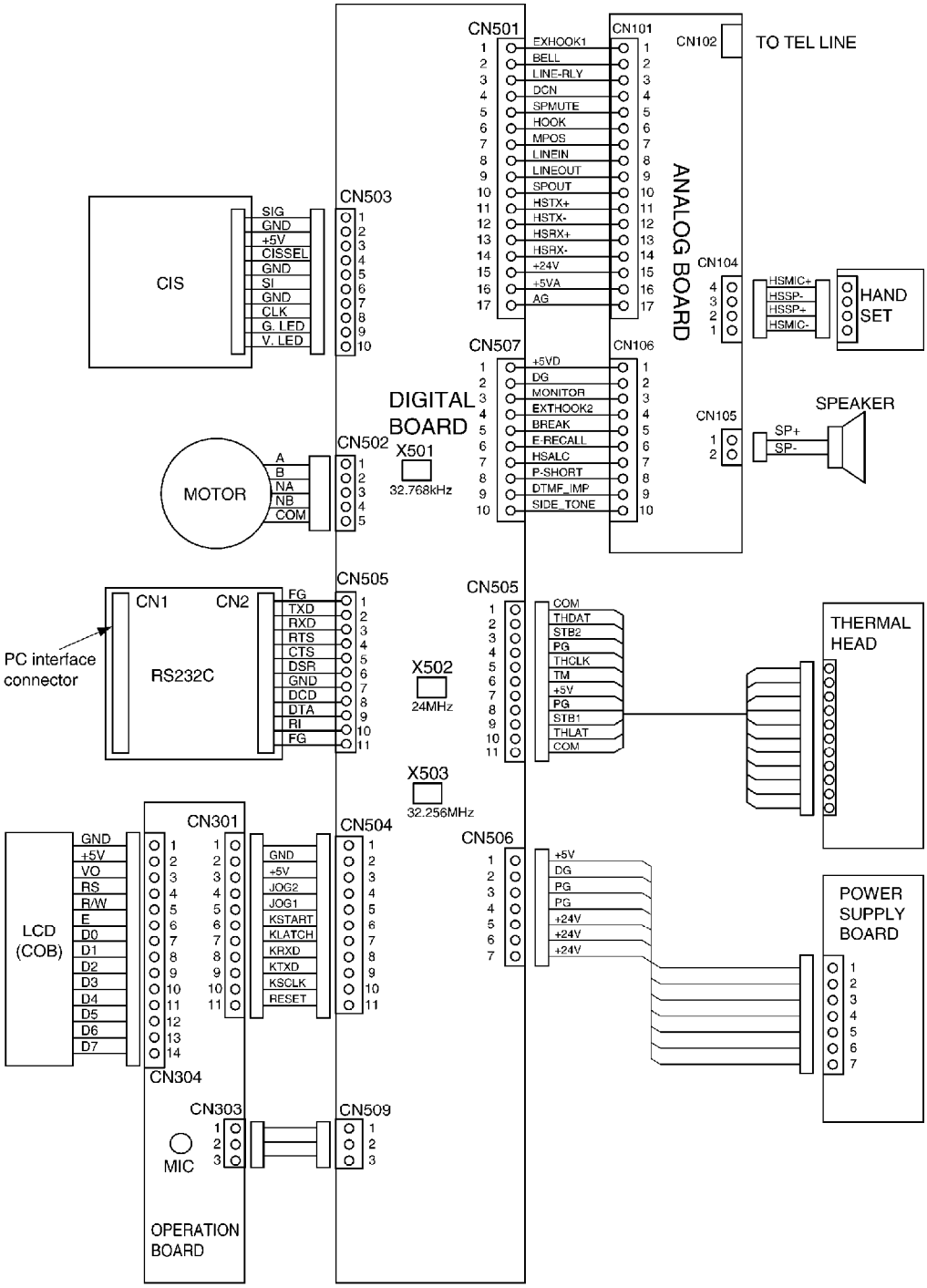
2. Remove the remaining solder along the pins using a soldering iron

as shown in the figure below.



6. CIRCUIT OPERATIONS

6.1. CONNECTION DIAGRAM



6.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board. (Refer to GENERAL BLOCK DIAGRAM().).

1. ASIC (IC501)

Composed mainly of an address decoder and a modem control.

Controls the general FAX operations.
Controls the operation panel I/F.
Controls the thermal head I/F and CIS I/F.
Performs the image processing.
CPU and Real time clock
Provides the reset pulse for each of the major ICs.

2. ROM (IC502)
Contains all of the program instructions on the unit operations.

3. Static RAM (IC504)
This memory is used mainly for the parameter working in the storage area.

4. Dynamic RAM (IC503)
This memory is used mainly for the parameter working in the storage area.

5. MODEM (IC505)
Performs the modulation and the demodulation for FAX communication.

6. Read Section
CIS image sensor to read transmitted documents.

7. Motor Driver (IC508)
Drives the transmission motor and the reception motor.

8. Thermal Head
Contains heat-emitting elements for dot matrix image printing.

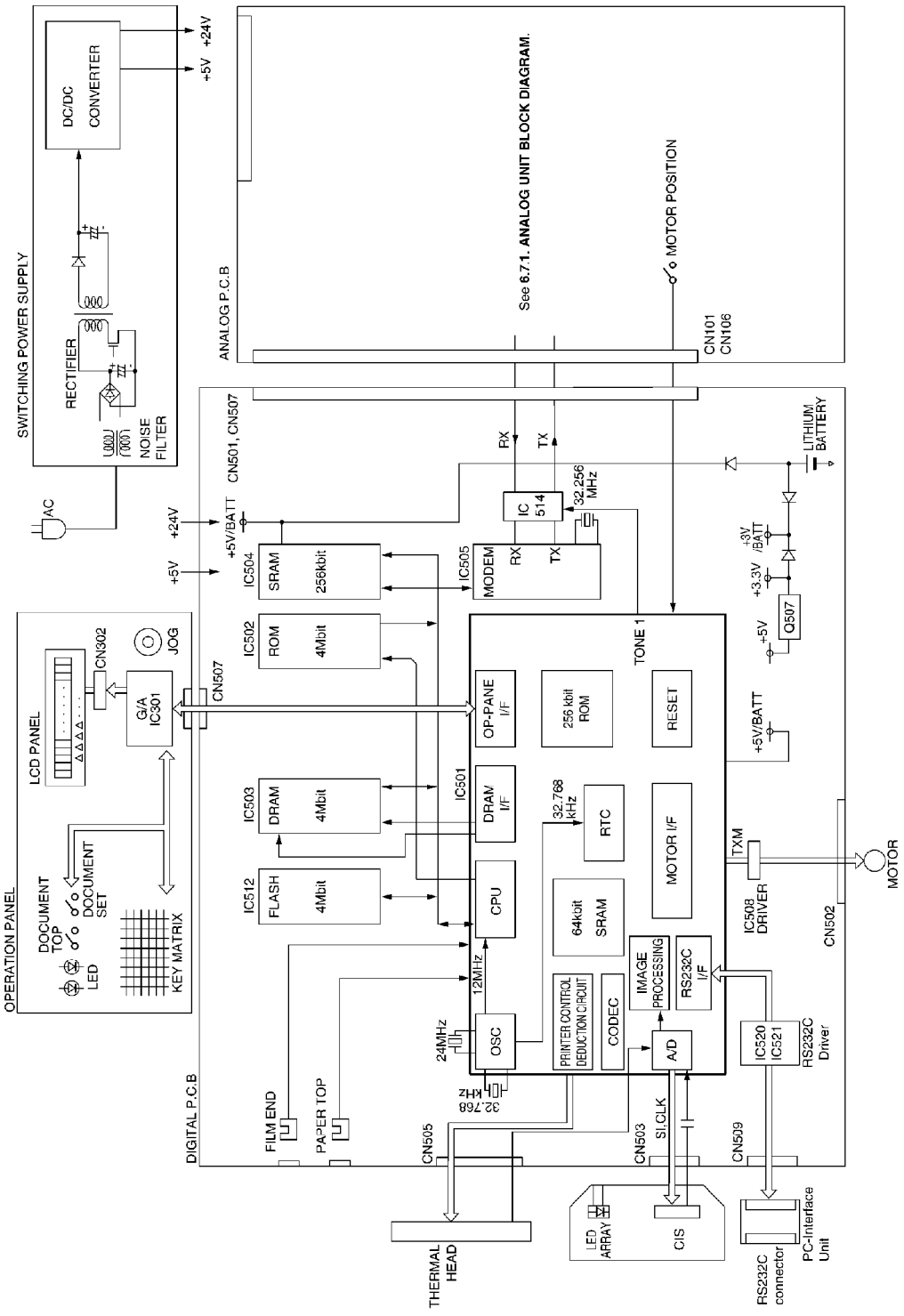
9. Analog Board
Composed of ITS circuit and NCU circuit.

10. Sensor Section
Composed of a cover open and film end switch, a document set switch, a document top switch, a paper top sensor and a motor position switch.

11. Power Supply Board Switching Section
Supplies +5V and +24V to the unit.

12. Flash Memory (IC512)
This memory is used for voice prompt and TAM.

6.2.1. GENERAL BLOCK DIAGRAM

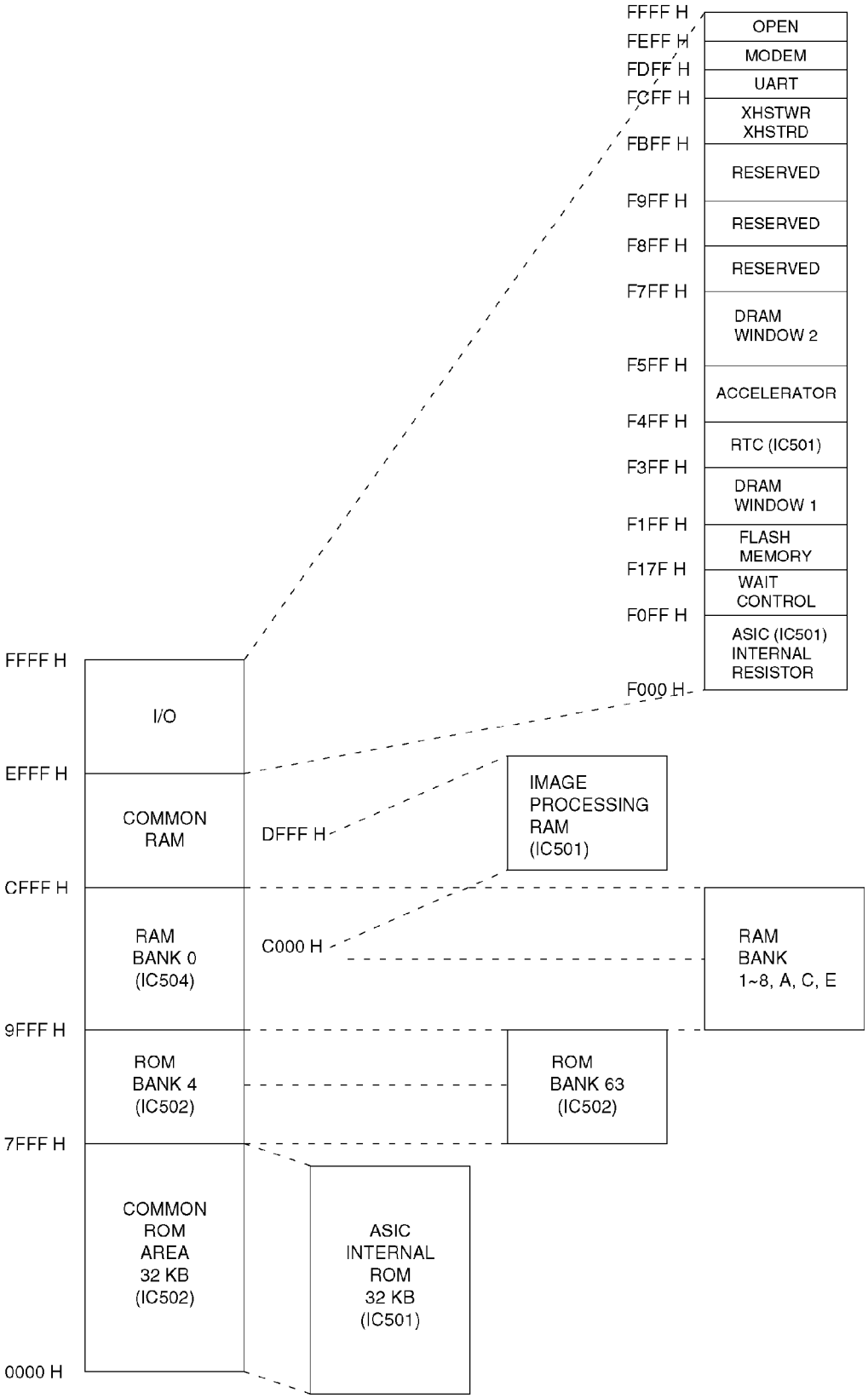


CROSS REFERENCE:
ANALOG UNIT BLOCK DIAGRAM()

6.3. CONTROL SECTION

6.3.1. BLOCK DIAGRAM

6.3.2. MEMORY MAP

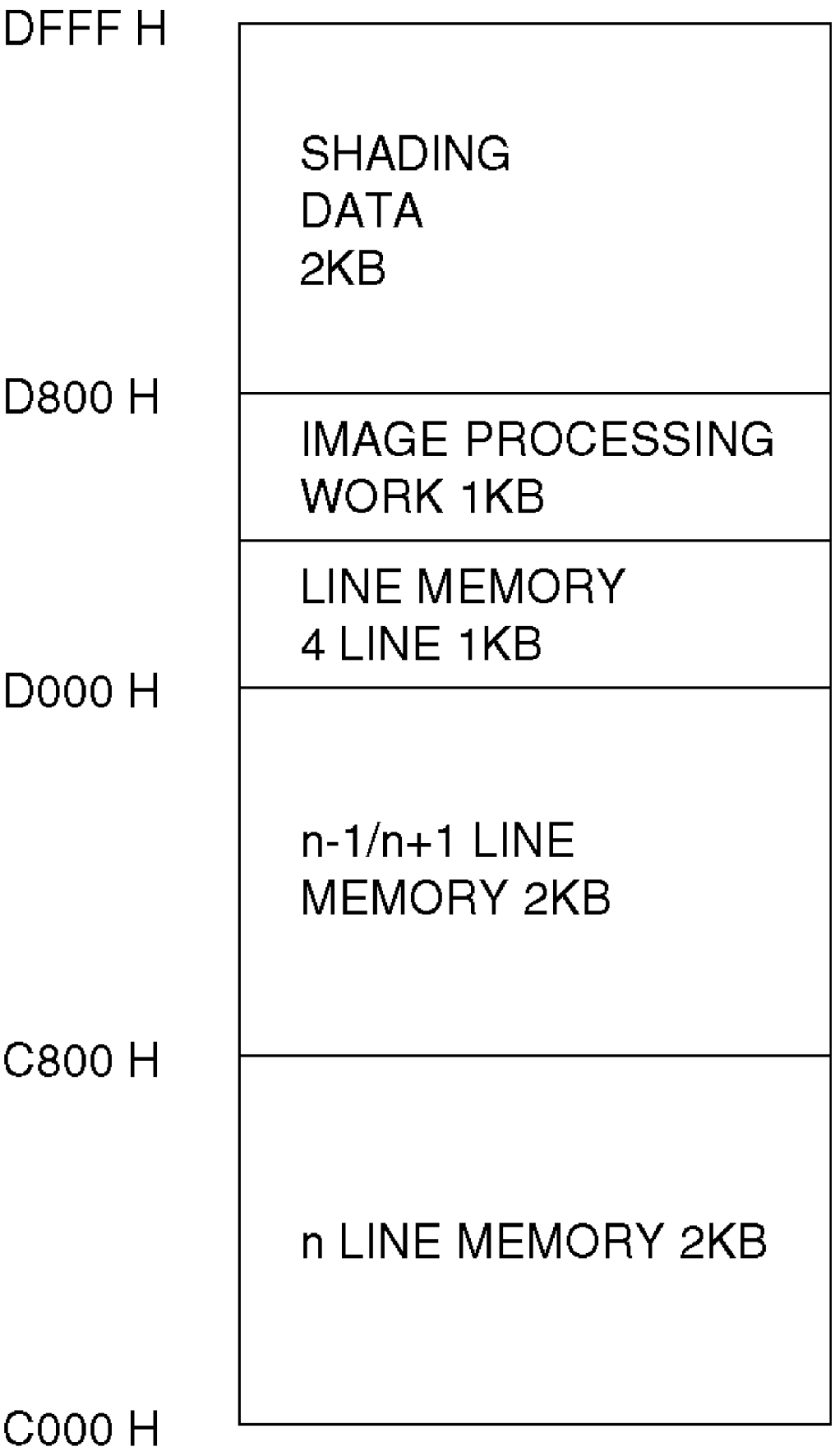


6.3.3. ASIC (IC501)

This custom IC is used for the general FAX operations.

1. **CPU:**
   This model uses a Z80 equivalent to the CPU operating at 12 MHz. Most of the peripheral functions are performed by custom-designed LSIs. Therefore, the CPU only works for processing the results.
2. **RTC:**
   Real Time Clock
3. **DECODER:**
   Decodes the address.
4. **ROM/RAM I/F:**
   Controls the SELECT signal of ROM or RAM and the bank switching.
5. **CIS I/F:**
   Controls the document reading.
6. **IMAGE DATA RAM:**
   This memory is programmed into the ASIC and uses 8 KB for the image processing. (See Fig. A.*)
7. **THERMAL HEAD I/F:**
   Transmits the recorded data to the thermal head.
8. **MOTOR I/F:**
   Controls the transmission motor which feeds the document.
   Controls the receiving motor which feeds the recording paper.
9. **OPERATION PANEL I/F:**
   Serial interface with Operation Panel.
10. **I/O PORT:**
    I/O Port Interface.
11. **ANALOG UNIT:**
    Electronic volume for the monitor.
    Sends beep tones, etc.

Fig. A


DFFF H
SHADING
DATA
2KB
D800 H
IMAGE PROCESSING
WORK 1KB
LINE MEMORY
4 LINE 1KB
D000 H
n-1/n+1 LINE
MEMORY 2KB
C800 H
n LINE MEMORY 2KB
C000 H

(CPU ADDRESS)

Note*:
This memory is incorporated into the ASIC (IC501) and used for the image processing.
Fig. A shows the memory map of the Image Data RAM.

6.3.4. ROM (IC502)

This 512KB ROM (EPROM or MASKROM or OTPROM) carries a common area of 32KB and bank areas which each have 8KB (BK4~BK63). The addresses from 0000H to 7FFFH are for the common area and from 8000H to 9FFFH are for the bank areas.

6.3.5. STATIC RAM (IC504)

This 32KB RAM carries a common area of 8KB and bank areas which each have 12KB. The addresses from 0000H to EFFFH are for the common area and from A000H to CFFFH are for the bank area.

6.3.6. DYNAMIC RAM (IC503)

The DRAM serves as CPU and receives memory.
The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

Descriptions of Pin Distribution (IC501)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
1	AIN1	A	3.3V	CCD IMAGE SIGNAL INPUT
2	AIN2	A	3.3V	THERMISTOR TEMPERATURE WATCH INPUT
3	AIN3	A	3.3V	----------
4	AMON	A	3.3V	ANALOG SIGNAL MONITOR TERMINAL
5	VSSB		GND	POWER SOURCE (ANALOG GNI
6	VDDB		3.3V	POWER SOURCE (ANALOG +3.3
7	VDD(3.3V/B)		3.3V/BATT	POWER SOURCE (+3.3V/LITHIU BATTERY)
8	X32OUT	O	3.3V/BATT	RTC (32.768KHz) CONNECTION
9	X32IN	I	3.3V/BATT	RTC (32.768KHz) CONNECTION
10	VSS		GND	GND
11	XBACEN	I	5V/BATT	BACKUP ENABLE
12	VDD (5V/B)		5V/BATT	POWER SOURCE (+5V/LITHIUM BATTERY)
13	XRAMCS	O	5V/BATT	RAM (IC504) CHIP SELECT
14	XRAMCS2	O	5V/BATT	----------
15	FTG	O	5V	SH SIGNAL OUTPUT FOR CIS
16	F1	O	5V	01 SIGNAL OUTPUT FOR CIS
17	F2/OP	O	5V	OUTPUT PORT (VOLOUTEN)
18	FR/OP	O	5V	OUTPUT PORT (RESERVED)
19	VIDRST/IOP	O	5V	OUTPUT PORT (PCTL)
20	SPHCLK/IOP	I	5V	INPUT PORT (PDET)
21	DARKON/IOP	I	5V	INPUT PORT (JOG1)
22	ADSEL2/IOP	I	5V	INPUT PORT (JOG2)
23	CPC	I	5V	INPUT PORT (T/P)
24	BELL	O	5V	OUTPUT PORT (LINE RLY)
25	VDD (5V)		5V	POWER SOURCE (+5V)
26	VSS		GND	POWER SOURCE (GND)
27	RVN	I	5V	INPUT PORT (FILM END SENSO SIGNAL)
28	IRDATXD/IOP	O	5V	(CRESET)
29	IRDARXD/ IOP80	I	5V	INPUT PORT (MDL SEL)
30	TXD/IOP	O	5V	OUTPUT PORT (TXD)
31	RXD/IOP	I	5V	INPUT PORT (RXD)
32	XRTS/IOP	O	5V	OUTPUT PORT (XRTS)
33	XCTS/IOP	I	5V	INPUT PORT (XCTS)
34	XDSR/IOP	I	5V	INPUT PORT (XDSR)
35	DCD/IOP	O	5V	OUTPUT PORT (DCD)
36	XDTR/IOP	O	5V	OUTPUT PORT (XDTR)
37	RI/CLK/IOP	O	5V	----------
38	TONE1		5V	TONE OUTPUT
39	TONE2		5V	TONE OUTPUT

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
40	VOLUREF		5V	ANALOG REF VOLTAGE
41	VOLUOUT		5V	VOLUME OUTPUT
42	VOLUIN		5V	VOLUME INPUT
43	MIDAT/IOP	A	5V	MIDAT
44	MICLK/IOP	A	5V	MICLK
45	MILAT/IOP	A	5V	MILAT
46	XRESCS1	O	5V	OUTPUT PORT (BREAK)
47	IOP90	O	5V	OUTPUT PORT (SPMUTE)
48	VSS		GND	POWER SOURCE (GND)
49	VDD (5V)		5V	POWER SOURCE (+5V)
50	XNMI	I	5V	HIGH FIXED
51	CBUSY2	O	5V	CBUSY2
52	CSO	O	5V	CSO
53	CBUSY1	I	5V	CBUSY1
54	CCLK	I	5V	CIO
55	CSI	I	5V	CSI
56	IOP91	O	5V	INPUT PORT (VOX)
57	IOP92	O	5V	OUTPUT PORT (RESERVER)
58	FMEMCS/IOP	O	5V	OUTPUT PORT (FCS)
59	FMEMDO/IOP	O	5V	OUTPUT PORT (ALE)
60	FMEMDI/IOP	O	5V	OUTPUT PORT (CLE)
61	FMEMCLK/IOP	I	5V	INPUT PORT (R/B)
62	XRESCS3/OP	O	5V	OUTPUT PORT (OP RESET)
63	20KOSC/IOP	O	5V	RESERVED
64	XHOLDAK	O	5V	NOT USED
65	VDD (3.3V)		3.3V	POWER SOURCE (+3.3V)
66	XOUT	O	3.3V	SYSTEM CLOCK (24MHz)
67	XIN	I	3.3V	SYSTEM CLOCK (24MHz)
68	VSS		GND	POWER SOURCE (GND)
69	VDD (5V)		5V	POWER SOURCE (+5V)
70	XTEST	O	5V	24MHz CLOCK
71	CPUCLK	O	5V	NOT USED
72	TEST1	I	5V	HIGH FIXED
73	TEST2	I	5V	HIGH FIXED
74	TEST3	I	5V	HIGH FIXED
75	TEST4	I	5V	HIGH FIXED
76	XMDMINT	I	5V	MODEM INTERRUPT
77	XMDMCS	O	5V	MODEM CHIP SELECT
78	VSS		GND	POWER SOURCE (GND)
79	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
80	XWAIT	I	5V	LOW FIXED
81	HOLD	I	5V	LOW FIXED
82	HSTRD/IOP	O	5V	FLASH MEMORY READ
83	HSTWR/IOP	O	5V	FLASH MEMORY WRITE
84	XOPRBE	O	5V	NOT USED

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
85	ADR15	O	5V	CPU ADDRESS BUS 15 (NOT US
86	ADR14	O	5V	CPU ADDRESS BUS 14 (NOT US
87	ADR13	O	5V	CPU ADDRESS BUS 13 (NOT US
88	XRAS/IOP	O	5V	DRAM (IC503) ROW ADDRESS STROBE
89	XCAS1/IOP	O	5V	DRAM (IC503) CULUM ADDRESS STROBE
90	XCAS2/IOP	O	5V	OUTPUT PORT (MODRST)
91	VSS		GND	POWER SOURCE (GND)
92	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
93	XRESCS2	O	5V	OUTPUT PORT (CSBR)
94	DB3	I/O	5V	CPU DATA BUS 3
95	DB2	I/O	5V	CPU DATA BUS 2
96	DB4	I/O	5V	CPU DATA BUS 4
97	DB1	I/O	5V	CPU DATA BUS 1
98	DB5	I/O	5V	CPU DATA BUS 5
99	DB0	I/O	5V	CPU DATA BUS 0
100	DB6	I/O	5V	CPU DATA BUS 6
101	DB7	I/O	5V	CPU DATA BUS 7
102	VSS		GND	POWER SOURCE (GND)
103	VDD (5V)		5V	POWER SOURCE (5V)
104	XROMCS	I/O	5V	ROM (IC502) CHIP SELECT
105	RD	O	5V	CPU RD
106	WR	O	5V	CPU WR
107	ADR0	O	5V	CPU ADDRESS BUS 0
108	ADR1	O	5V	CPU ADDRESS BUS 1
109	ADR2	O	5V	CPU ADDRESS BUS 2
110	ADR3	O	5V	CPU ADDRESS BUS 3
111	ADR4	O	5V	CPU ADDRESS BUS 4
112	ADR5	O	5V	CPU ADDRESS BUS 5
113	ADR6	O	5V	CPU ADDRESS BUS 6
114	ADR7	O	5V	CPU ADDRESS BUS 7
115	ADR8	O	5V	CPU ADDRESS BUS 8
116	ADR9	O	5V	CPU ADDRESS 9
117	ADR10	O	5V	CPU ADDRESS 10
118	ADR11	O	5V	CPU ADDRESS 11
119	ADR12	O	5V	CPU ADDRESS 12
120	VSS		GND	POWER SOURCE (GND)
121	VDD (5V)		5V	POWER SOURCE (+5V)
122	RBA0	O	5V	ROM/RAM BANK ADDRESS 0
123	RBA1	O	5V	ROM/RAM BANK ADDRESS 1
124	RBA2	O	5V	ROM/RAM BANK ADDRESS 2
125	RBA3	O	5V	ROM/RAM BANK ADDRESS 3
126	RBA4	O	5V	ROM/RAM BANK ADDRESS 4
127	RBA5	O	5V	ROM/RAM BANK ADDRESS 5

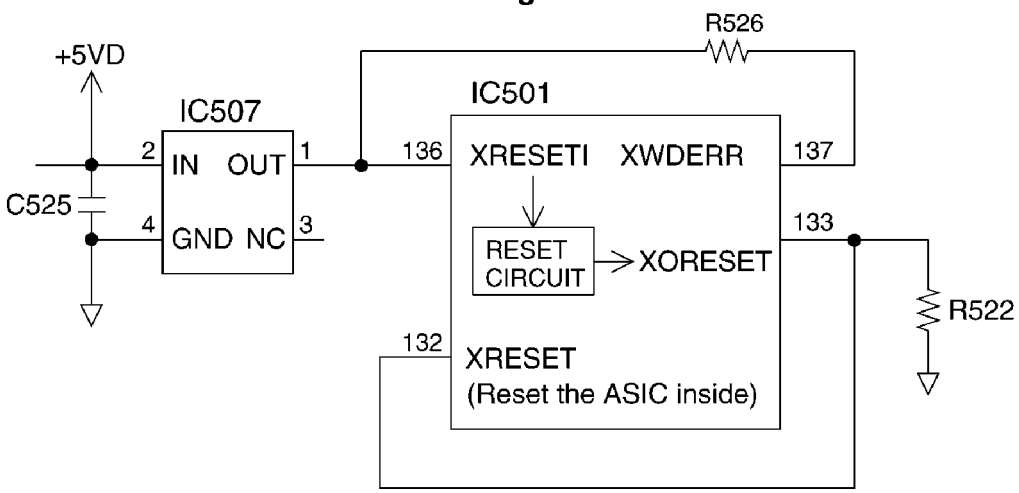
NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
128	RBA6/IOP96	O	5V	OUTPUT PORT (S/ENB)
129	IOP95	O	5V	OUTPUT PORT (SEN LED ON)
130	IOP94	O	5V	OUTPUT PORT (RESERVER)
131	IOP93	I	5V	OUTPUT PORT (CIS LED ON)
132	XRESET	I	5V	RESET INPUT
133	XORESET	O	5V	RESET OUTPUT
134	VDD (5V)		5V	POWER SOURCE (+5V)
135	VSS		GND	POWER SOURCE (GND)
136	XRESETI	I	5V	RESET INPUT
137	WDERR	O	5V	WATCHED ERROR OUTPUT SIG
138	XRSTSWI	I	5V	INPUT PORT (MPOS)
139	XRSTSWO	O	5V	OUTPUT PORT (VOLIN SEL2)
140	XRESETO	O	5V	NOT USED
141	IOP	O	5V	THERMAL HEAD POWER ON/OF CONTROL
142	STB1	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
143	STB2	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
144	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
145	VSS		GND	POWER SOURCE (GND)
146	STB3	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
147	STB4	O	5V	NOT USED
148	STBNP	I	5V	INPUT PORT (CPC)
149	THDAT	O	5V	RECORDED IMAGE OUTPUT
150	THCLK	O	5V	CLOCK OUTPUT FOR DATA TRANSFER
151	THLAT	O	5V	PULSE OUTPUT FOR DATA LAT
152	RM0/IOP	I	5V	INPUT PORT (P-TOP)
153	RM1/IOP	I	5V	INPUT PORT (DCN)
154	RM2/IOP	I	5V	INPUT PORT (CPC)
155	RM3/IOP	O	5V	OUTPUT PORT (VOLIN SEL1)
156	RXE/IOP	I	5V	INPUT PORT (NOT USED)
157	TMO	O	5V	MOTOR A PHASE
158	VDD (5V)		5V	POWER SOURCE (+5V)
159	VSS		GND	POWER SOURCE (GND)
160	TM1/IOP	O	5V	MOTOR B PHASE
161	TM2/IOP	O	5V	MOTOR /A PHASE
162	TM3/IOP	O	5V	MOTOR /B PHASE
163	TXE/IOP	O	5V	MOTOR ENABLE SIGNAL
164	KSTART	O	5V	OPERATION PANEL CONTROL
165	KLATCH	O	5V	OPERATION PANEL CONTROL
166	KSCLK	O	5V	OPERATION PANEL CONTROL
167	KTXD	O	5V	OPERATION PANEL CONTROL

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
168	KRXD	I	5V	OPERATION PANEL CONTROL
169	ADSEL1	O	5V	CHANNEL SELECT SIGNAL FOR
170	VSSC		GND	POWER SOURCE (ANALOG GNI
171	VDDC		3.3V	POWER SOURCE (ANALOG +3.3
172	VSSA		GND	POWER SOURCE (ANALOG GNI
173	VDDA		3.3V	POWER SOURCE (ANALOG +3.3
174	VREFB	A	3.3V	A/D CONVERTER'S ZERO STANDARD VOLTAGE OUTPUT
175	VCL	A	3.3V	ANALOG PART STANDARD VOLTAGE SIGNAL
176	VREFT	A	3.3V	A/D CONVERTER'S FULL SCALI VOLTAGE OUTPUT

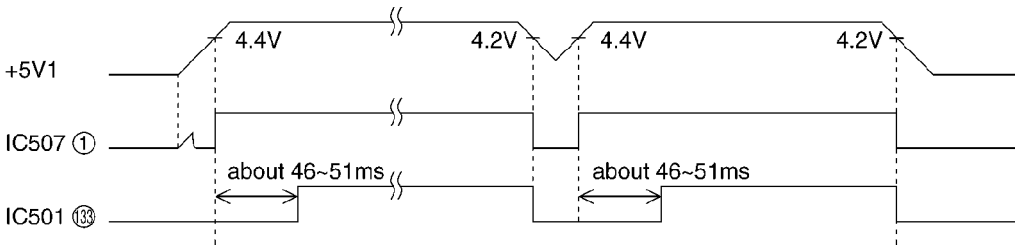
6.3.7. RESET CIRCUIT (WATCH DOG TIMER)

The output signal from pin 1 of the voltage detect IC (IC507) is input to the ASIC (IC501) 136 pin. Then the output signal from pin 133 of the ASIC (IC501) resets the ASIC.

Circuit Diagram



1. During a momentary power interruption, a positive reset pulse of 46~51 msec is generated and the system is reset completely.



2. When pin 132 and 133 of IC501 become low level, they will prohibit the SRAM (IC503) from changing data.
The SRAM (IC504) will go into the backup mode, when they are

backed up by a lithium battery.

3. The watch dog timer, built-in the ASIC (IC501), is initialized by the CPU about every 1.5 ms.
   When a watch dog error occurs, pin 137 of the ASIC (IC501) becomes low level.
   The terminal of the 'WDERR' signal is connected to the reset line, so the 'WDERR' signal works as the reset signal.

6.3.8. SRAM AND RTC BACKUP CIRCUIT

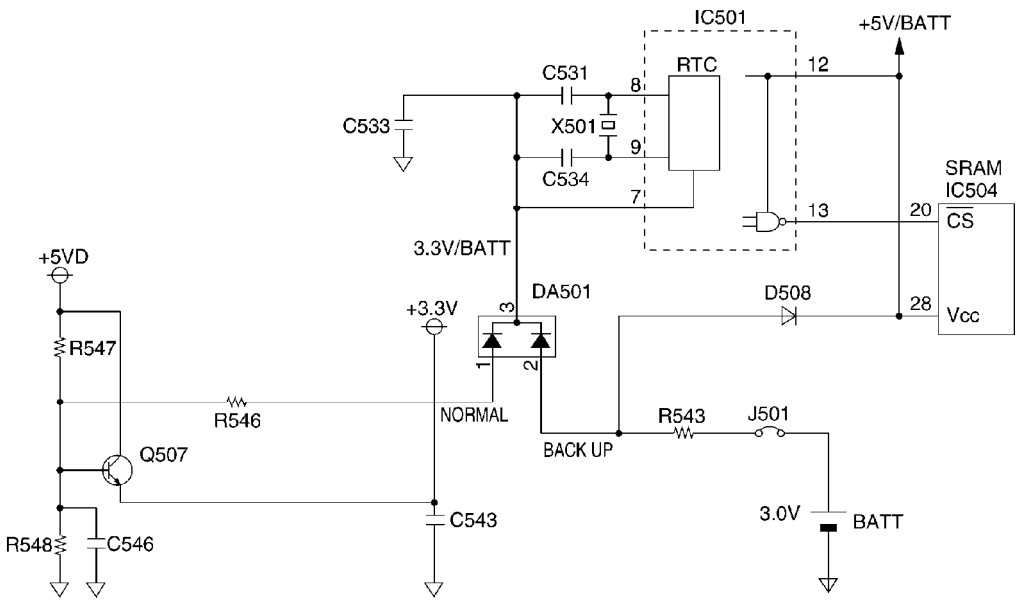
1. Function
   This unit has a lithium battery (BAT501) which works for the SRAM (IC504) and Real Time Clock IC (RTC: inside IC501).
   The user parameters for autodial numbers, the system setup data and others are stored in the SRAM (IC504).
   The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

2. SRAM (IC504) Backup Circuit Operation
   When the power switch is turned ON, power is supplied through pin 12 of IC501 to the SRAM (IC504). At this time, the voltage at pin 28 of the SRAM is 5V. When the power switch is turned OFF, the BAT501 supplies power to the SRAM through J501, R543 and D508. The voltage at pin 28 of the SRAM is about +2.5V. When the power switch is OFF and the voltage of +5V decreases, the voltage detect IC (IC507) outputs "Low" level and the IC501 outputs the reset signal. Pin 28 of the SRAM becomes roughly the same voltage as the battery voltage. At this point, pin 20 (CS) of IC504 becomes high level, causing the SRAM to go into the backup mode, in which the power consumption is lower.

3. RTC Inside (IC501) Backup Circuit Operation
   When the power switch is turned ON, power is supplied through DA501 to the RTC (inside IC501). At this time, the voltage at pin 7 of the IC501 is +3.3V. When the power switch is turned OFF, the BAT501 supplies power to RTC through DA501. Thevoltage at pin 7 of IC501 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 7 of RTC (IC501) becomes roughly the same voltage as the battery voltage. RTC goes into the backup

mode, in which the power consumption is lower.

Circuit Diagram



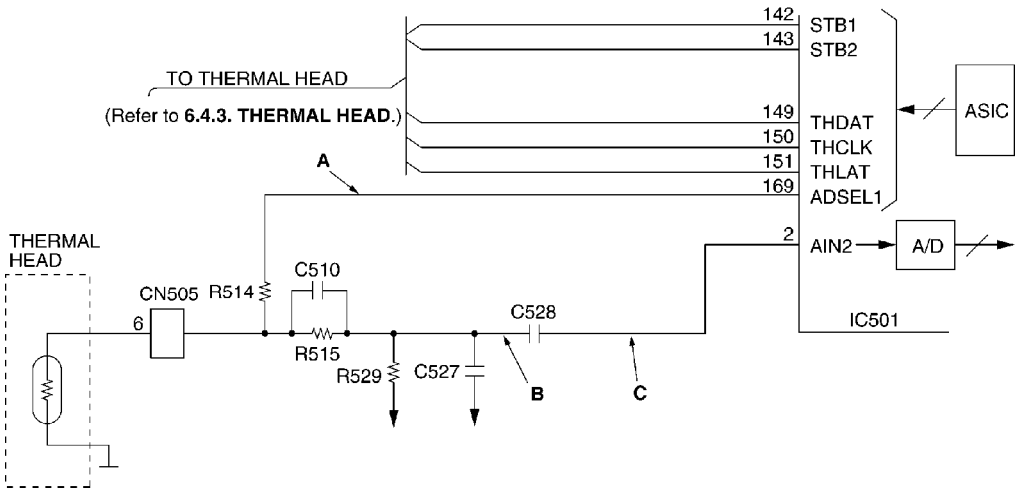
6.3.9. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

1. Function

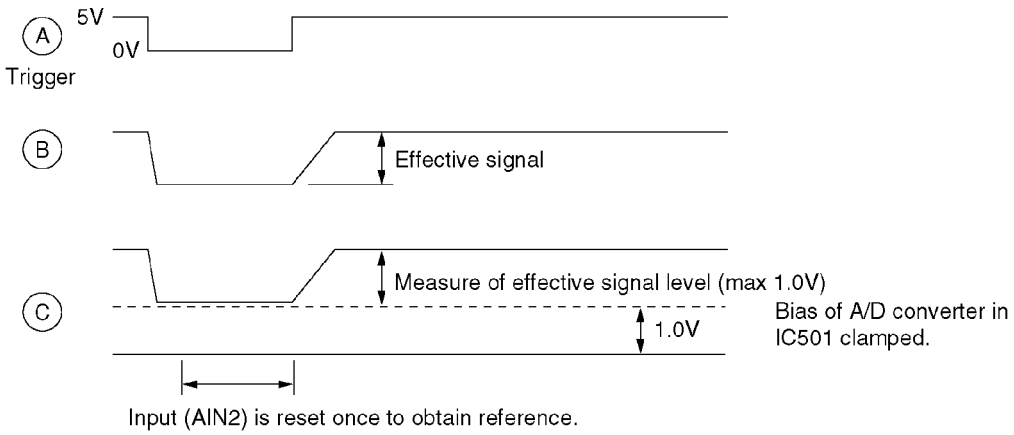
The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. The output of pin 169 of IC501 becomes a low level. Then when it becomes a high level, it triggers point A In point C, according to the voltage output time, the thermal head's temperature is detected.

After the thermal head temperature is converted to voltage in B, it is then changed to digital data in the A/D converter inside IC501. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram



Timing Chart



CROSS REFERENCE:
THERMAL HEAD()

6.4. FACSIMILE SECTION

6.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

Copy (Fine, Super-Fine, Half Tone)

1. **Line information is read by CIS (to be used as the reference white level) via route1, and is input to IC501. Refer to BLOCK DIAGRAM()**
2. **In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route2 it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route3. Then via route4 and route5, it is stored in RAM as shading data.**

3. The draft's information that is read by CIS is input to IC501 via route1. After it is adjusted to a suitable level for A/D conversion via route2, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via route6 and route7, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Then via routes4 and 5, they are stored in RAM.
4. The white/black data stored as above via routes6 and8 is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route9 and is printed out on recording paper.

Note:
Standard : Reads 3.58 times/mm
Fine : Reads 7.7 times/mm
Super-Fine : Reads 15.4 times/mm

Transmission

1. Same processing as Copy items 1 - 3.
2. The data stored in the RAM of IC501 is output from IC501 via routes6 and 10, and is stored in the system bus.
   Via route11, it is stored in the communication buffer inside DRAM (IC503).
3. While retreiving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route12, where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.

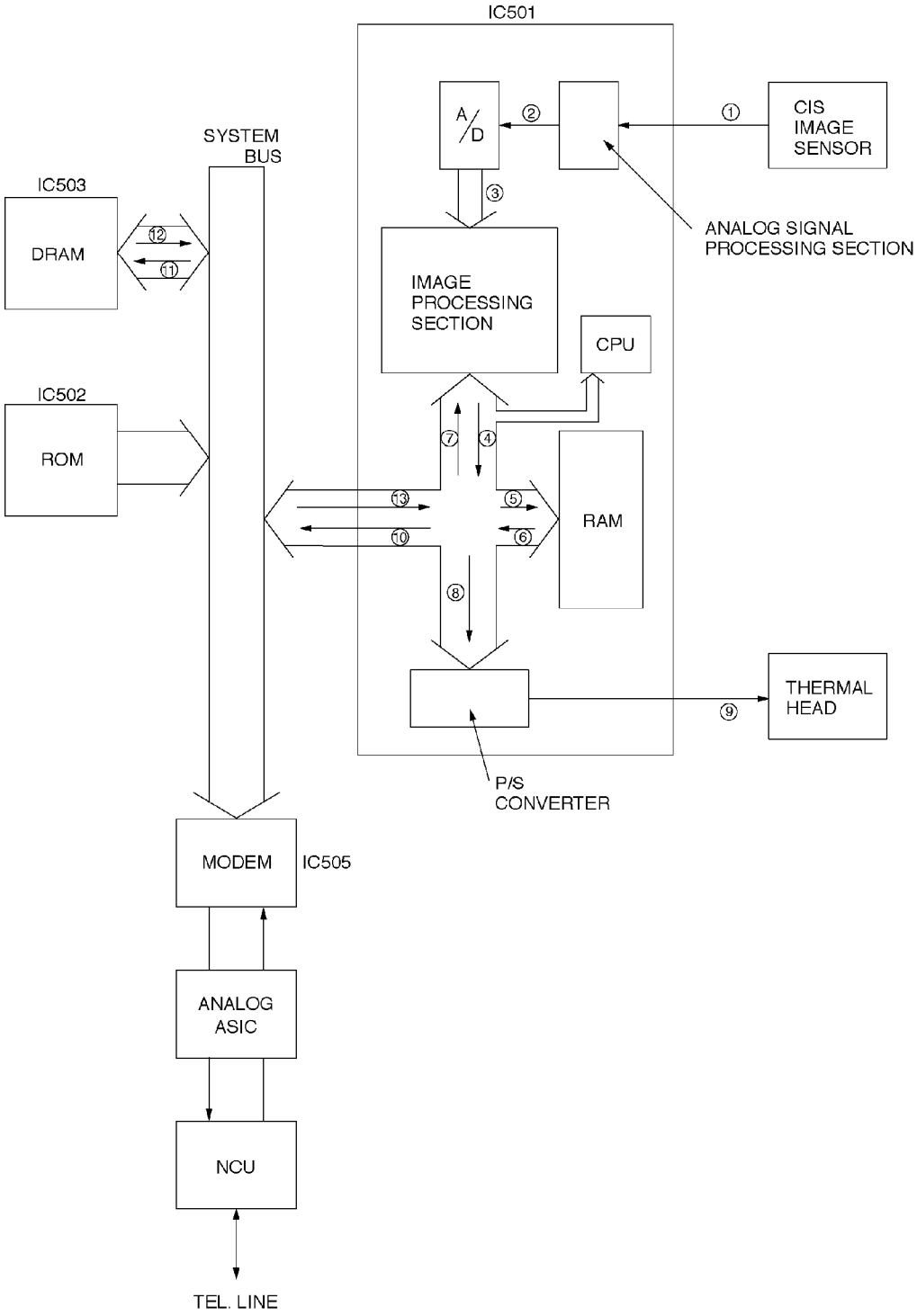
Reception

1. The serial analog image data is received over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores

the data in the communication buffer DRAM (IC503) along route12.

2. The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route12, and is stored in DRAM (IC503) via routes13 and 5.
3. Same processing as Copy item 4.

6.4.2. BLOCK DIAGRAM



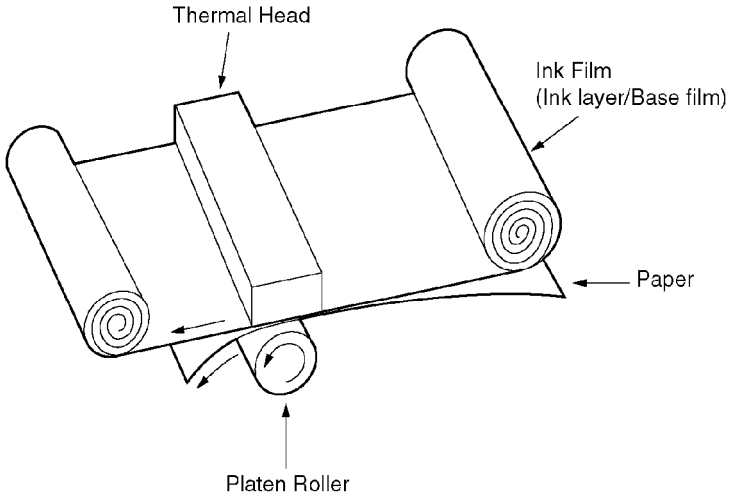
6.4.3. THERMAL HEAD

1. Function

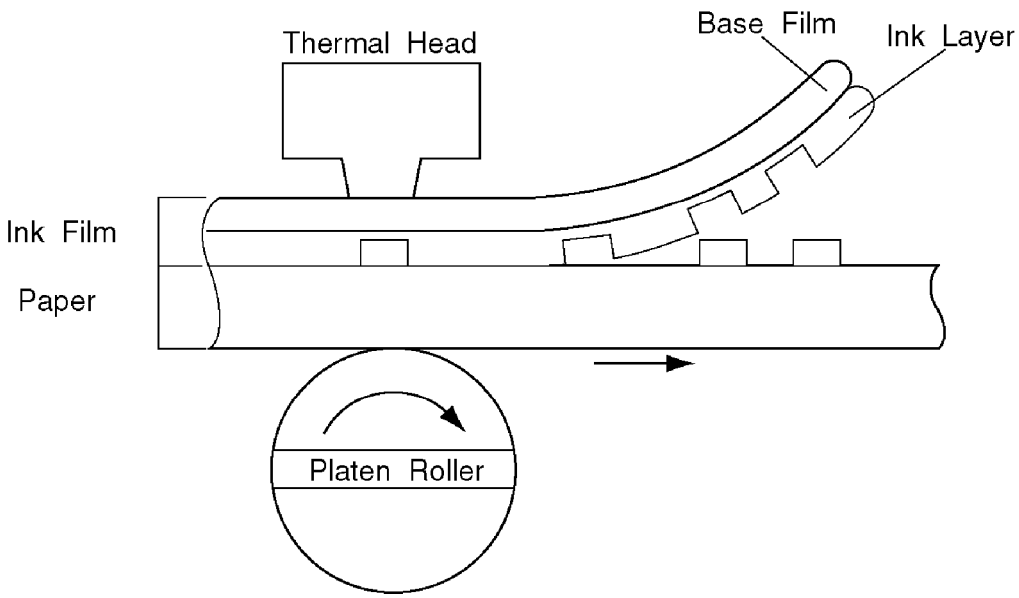
This unit utilizes the state of the art thermal printer technology. The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermalhead contacts this ink film, it emits heat momentarily, and the ink layer

is melted and transferred to the paper. If this continues, letters and/ or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)



Thermal Transfer



2. Circuit Operation

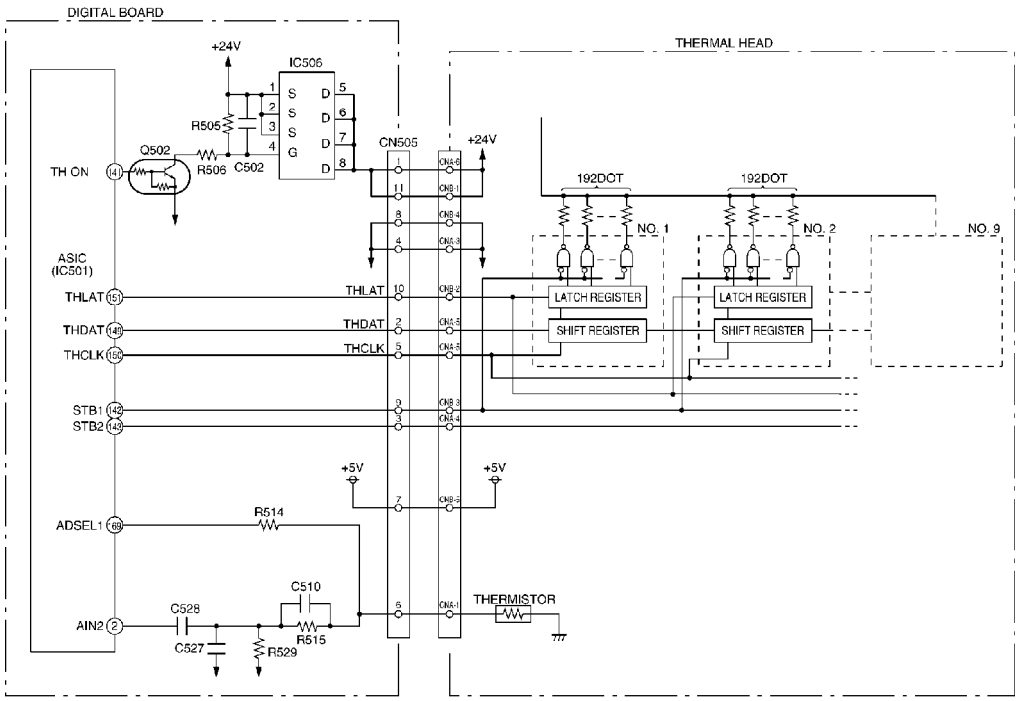
Refer to the block diagram and the timing chart on the following page.

There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat-emitting registers. This means that one line is at a density of 192×9=1728 dots=(8 dots/ mm).

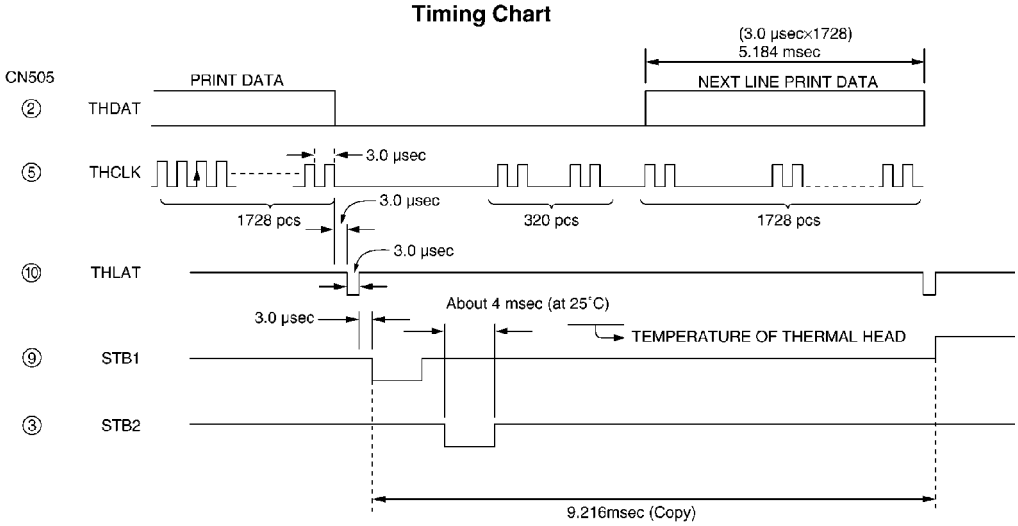
White/Black (white=0, black=1) data in one line increment is

synchronized at IC501 pin 150 (THCLK), and sent from IC501 pin 149 (THDAT) to the shift register of the ICs. The shift registers of the 9 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes filled with data, and a latch pulse is emitted to each IC from IC501 pin 151 (THLAT). With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC501 pins (142, 143), only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission.
Here, the two line strobes, STB1 to STB2, impress at intervals of 9.216 msec, as required for one-line printout.
The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC501 pin 2. Depending on that value, the strobe width is recorded in ROM (IC502). Accordingly, the strobe width is determined.]
When the thermal head is not used, the IC501 (141, THON) becomes low , Q502 turns OFF, IC506 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram



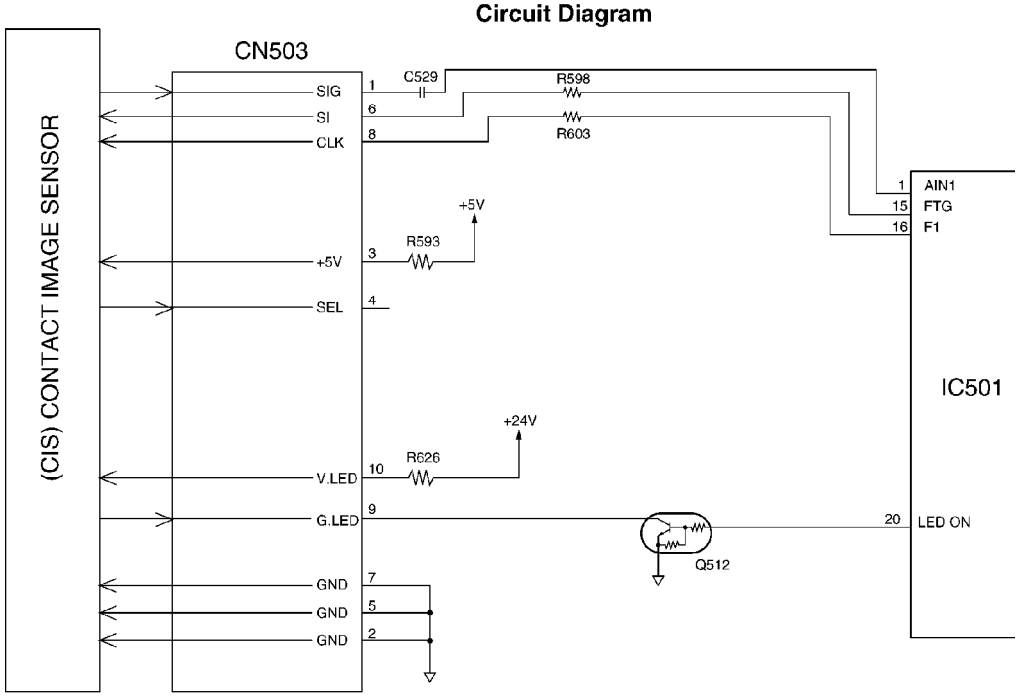
Timing Chart



6.4.4. SCANNING BLOCK

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram



When an original document is inserted and the start button pressed, pin 20 of IC501 goes to a high level and the transistor Q512 turns on.This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC501, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system ASIC on AIN1 (pin 1 of IC501) and converted into 8-bit data by the A/D converter inside IC501. Then this signal undergoes digital processing in order to obtain a high-quality image.

6.4.5. STEPPING MOTOR DRIVE CIRCUIT

1. Function

The stepping motor works for both transmission and reception.

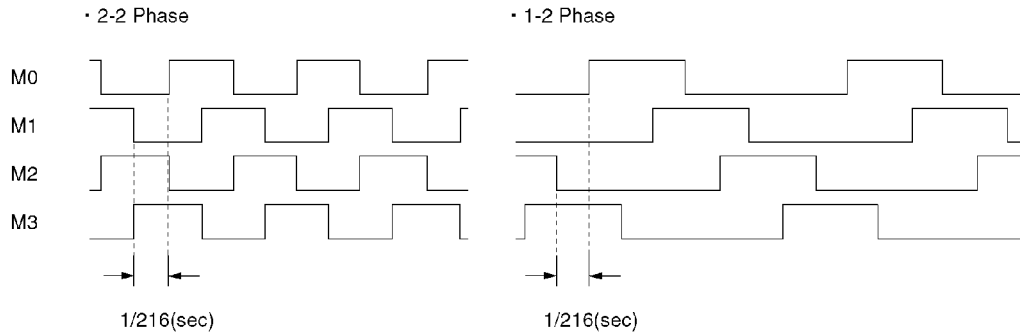
2. Motor

During motor driving, pin 163 of ASIC IC501 becomes a high level, and Q503, Q501 turns ON. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from ASIC IC501 pins, 157, 160~162, causing driver IC508 pins, 16~13 to drive the Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper.

The timing chart is below.

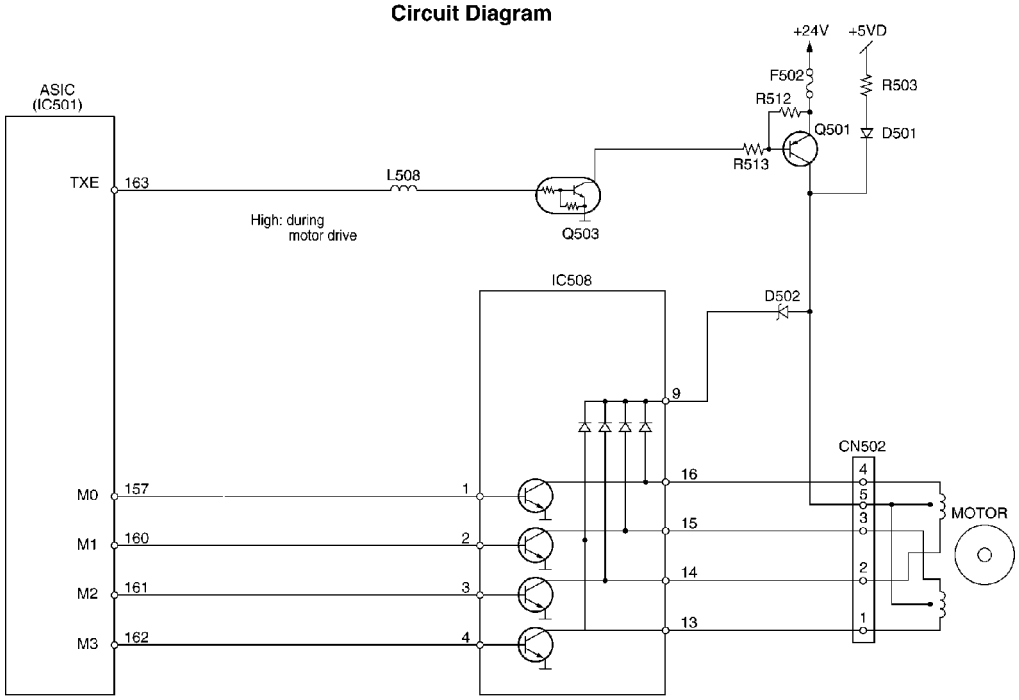
Stepping Monitor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Fine	1-2	216 pps
FAX	Standard	2-2	216 pps
	Fine or Half tone	1-2	216 pps
Paper Feed	———	2-2	216 pps
Stand-by	———	All phases are currently off.	None

Circuit Diagram



When the motor suspends while it is in the receive mode (about 70~80 msec), pin 163 of ASIC IC501 becomes a low level and Q503 turns OFF. Then Q501 also turns OFF, and instead of +24 V, +5 V is supplied through D501 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors turn OFF. Consequently, the motor current stops.

6.4.6. GEAR SECTION

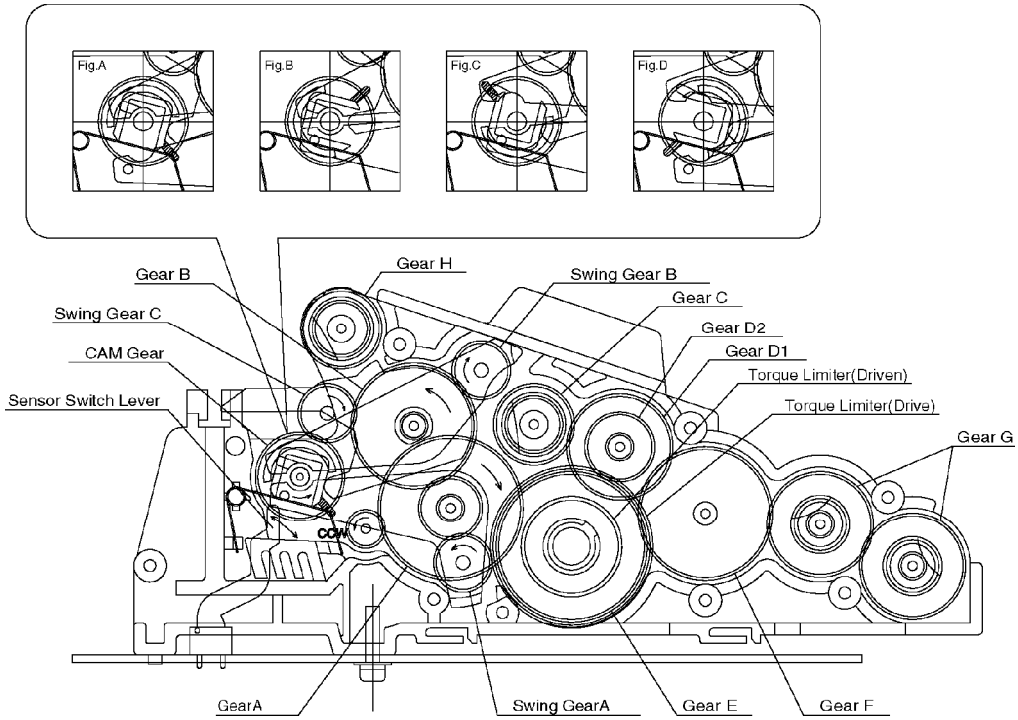
This model provides a motor-driven gear mechanism for transmitting/copying documents and printing fax data. In this chapter, you will see how the gears work to select and operate a mode and how the gear section, sensors and rollers mechanically work during the main operations (FAX transmission, FAX reception and Copy).

6.4.6.1. MODE SELECTION (See Fig. 1)

When a motor with Drive Motor Gear attached rotates clockwise (CW), Swing Gear C engages G15 and drives G14 to rotate counterclockwise. This operation provide four mode options (A: Transmit mode, B: Paper-Pickup mode, C: Receive mode and D: Copy mode) selected by the Sensor Switch. (The Sensor Switch Lever's position in the CAM (G15) controlled by the software selects a specific mode.) You can see which mode is selected by confirming the Mode Marker's position as shown in / Fig. 1-a~1-d.
(Ex. If the Mode Marker is in position A, a transmit mode is selected.)

Note:
The arrows show the directions in which the active gears turn around.

Fig. 1: Mode Selection

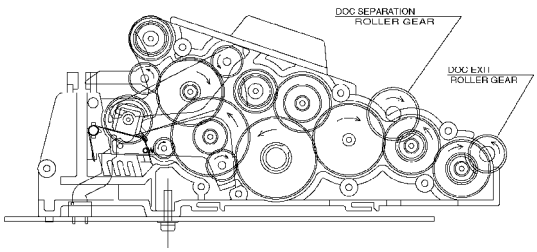


6.4.6.2. MODE OPERATION

Once a mode is selected, the Drive Motor Gear rotates counterclockwise (CCW) and then the controlling positions of Swing Gears A, B and C determine which gears convey their drive power in each mode.

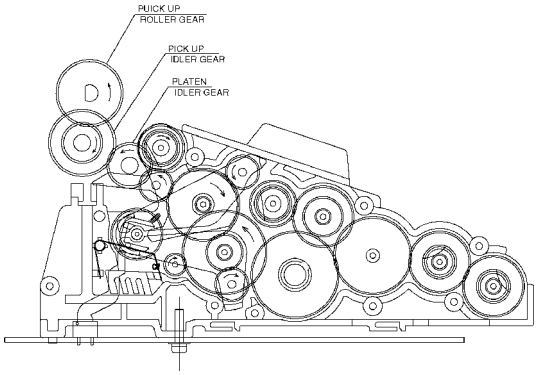
A. Transmit mode (See Fig. A.) :
Swing Gear C engages G4 and conveys its power to the Separation Roller Gear through G3 and sets the Separation Roller for feeding documents.

Fig. A: Transmit mode



B. Paper-Pickup mode (See Fig. B) :
Swing Gear A engages G10 and provides its power to the Pickup Roller Gear through G8. The Pickup Roller picks up and pre-feeds a recording paper until the recording paper pushes up the PAPER TOP SENSOR* lever.

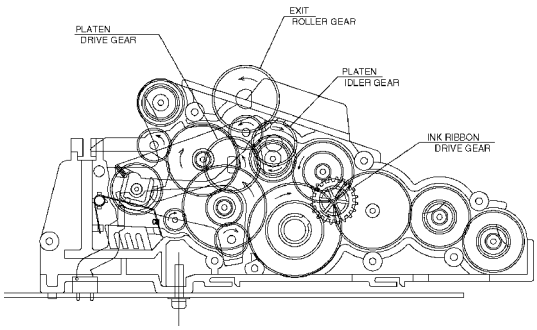
Fig. B: Paper-Pickup mode



Note* :
See "Sensor Location" in SENSORS AND SWITCHES().

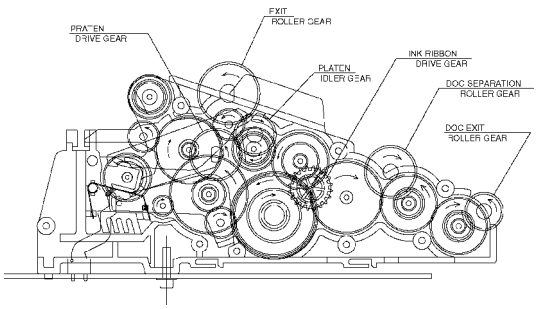
C. Receive mode (See Fig. C.) :
Swing Gear B engages G13 and conveys its power to the Platen Roller Gear through G6. Then, the Platen Roller feeds recording paper for printing the received data.

Fig. C: Receive mode



D. Copy mode (See Fig. D.) :
Swing Gears B and C engages G13 and G4 respectively, and then G6 and G3 drive the Pickup Roller Gear and the Separation Roller Gear for feeding recording paper and documents when the unit is in the copy operation.

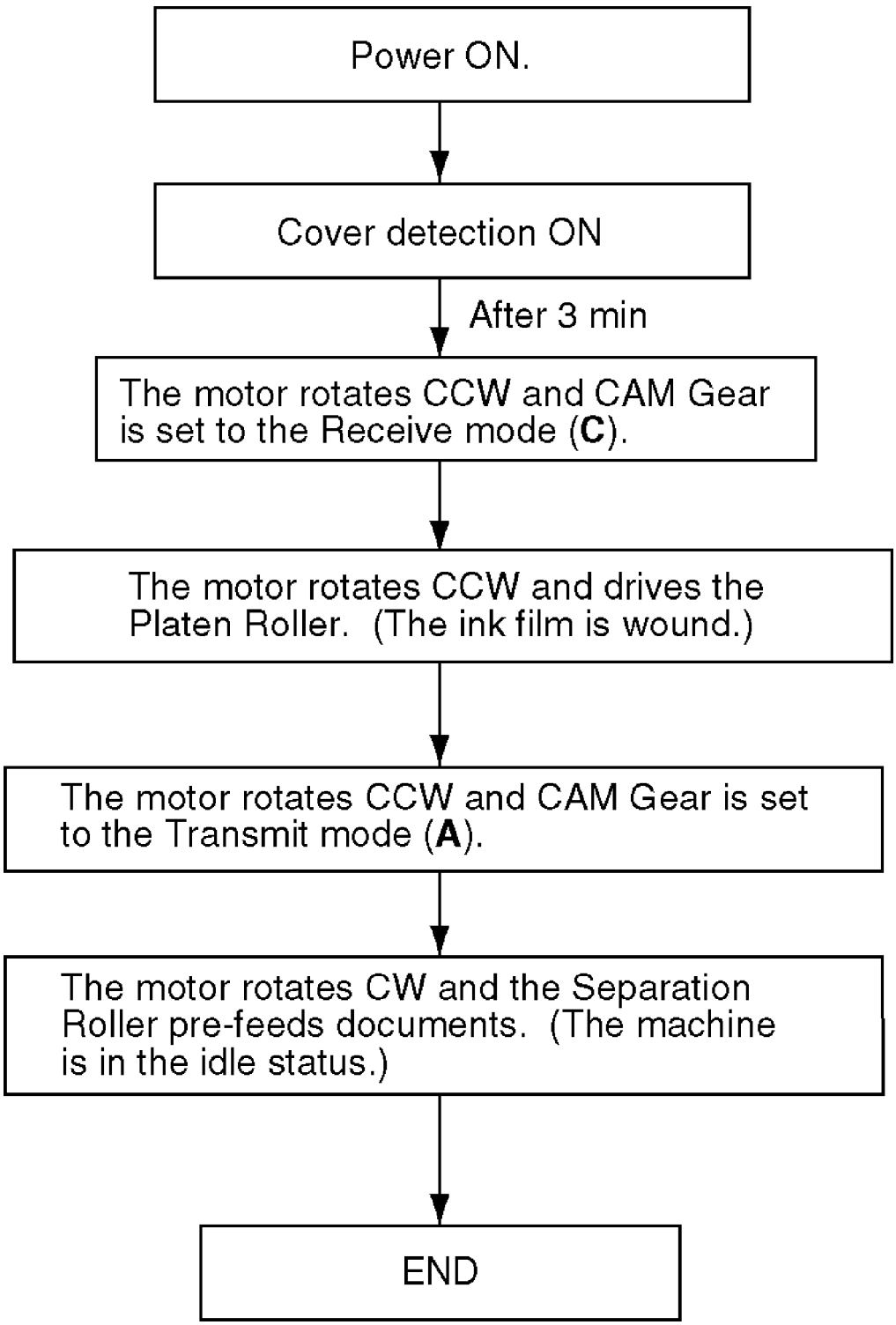
Fig. D: Copy mode



6.4.6.3. MECHANICAL MOVEMENTS IN THE MAIN OPERATIONS (transmitting documents,

receiving faxes and copying)

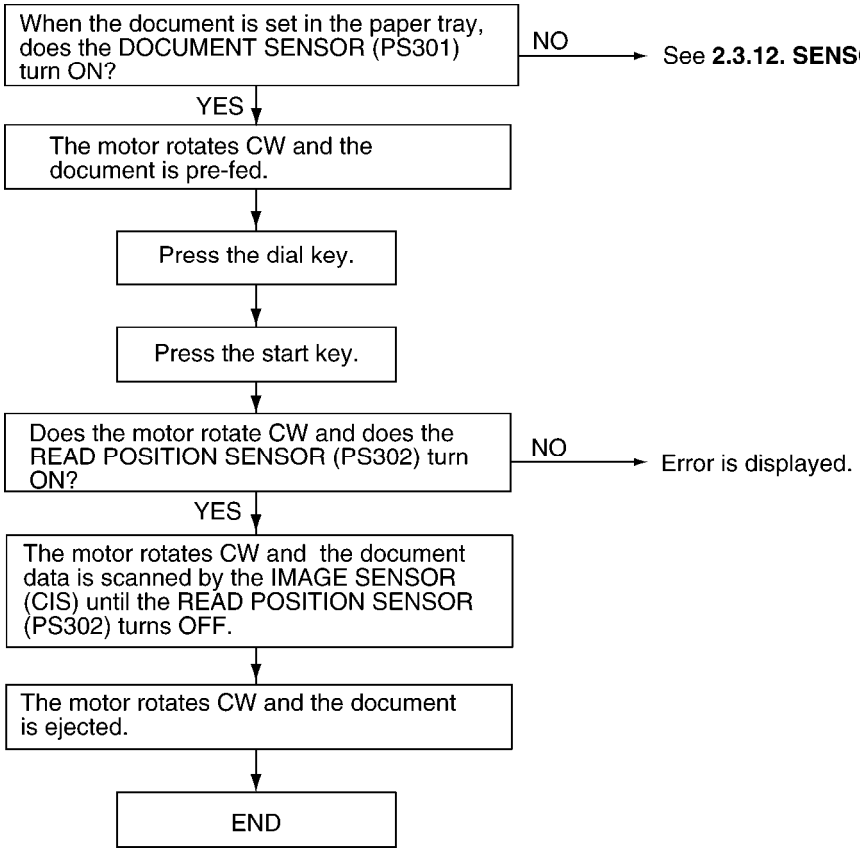
6.4.6.3.1. IDLE STATUS


Power ON.
Cover detection ON
After 3 min
The motor rotates CCW and CAM Gear is set to the Receive mode (C).
The motor rotates CCW and drives the Platen Roller. (The ink film is wound.)
The motor rotates CCW and CAM Gear is set to the Transmit mode (A).
The motor rotates CW and the Separation Roller pre-feeds documents. (The machine is in the idle status.)
END

Note:

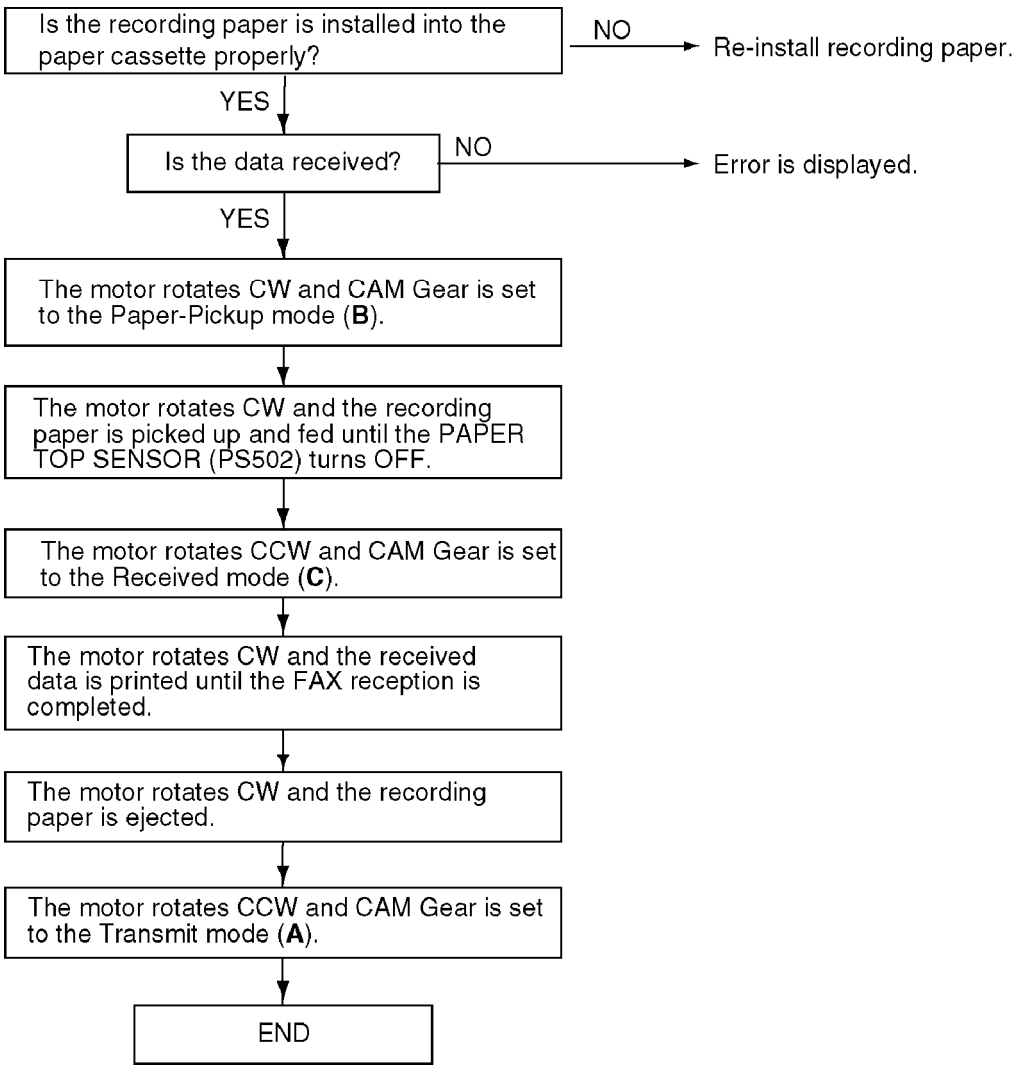
See “Sensor Locations” in SENSORS AND SWITCHES().

6.4.6.3.2. TRANSMITTING DOCUMENTS


When the document is set in the paper tray, does the DOCUMENT SENSOR (PS301) turn ON?
NO
See 2.3.12. SENSOR SECTION.
YES
The motor rotates CW and the document is pre-fed.
Press the dial key.
Press the start key.
Does the motor rotate CW and does the READ POSITION SENSOR (PS302) turn ON?
NO
Error is displayed.
YES
The motor rotates CW and the document data is scanned by the IMAGE SENSOR (CIS) until the READ POSITION SENSOR (PS302) turns OFF.
The motor rotates CW and the document is ejected.
END

CROSS REFERENCE:
SENSOR SECTION().

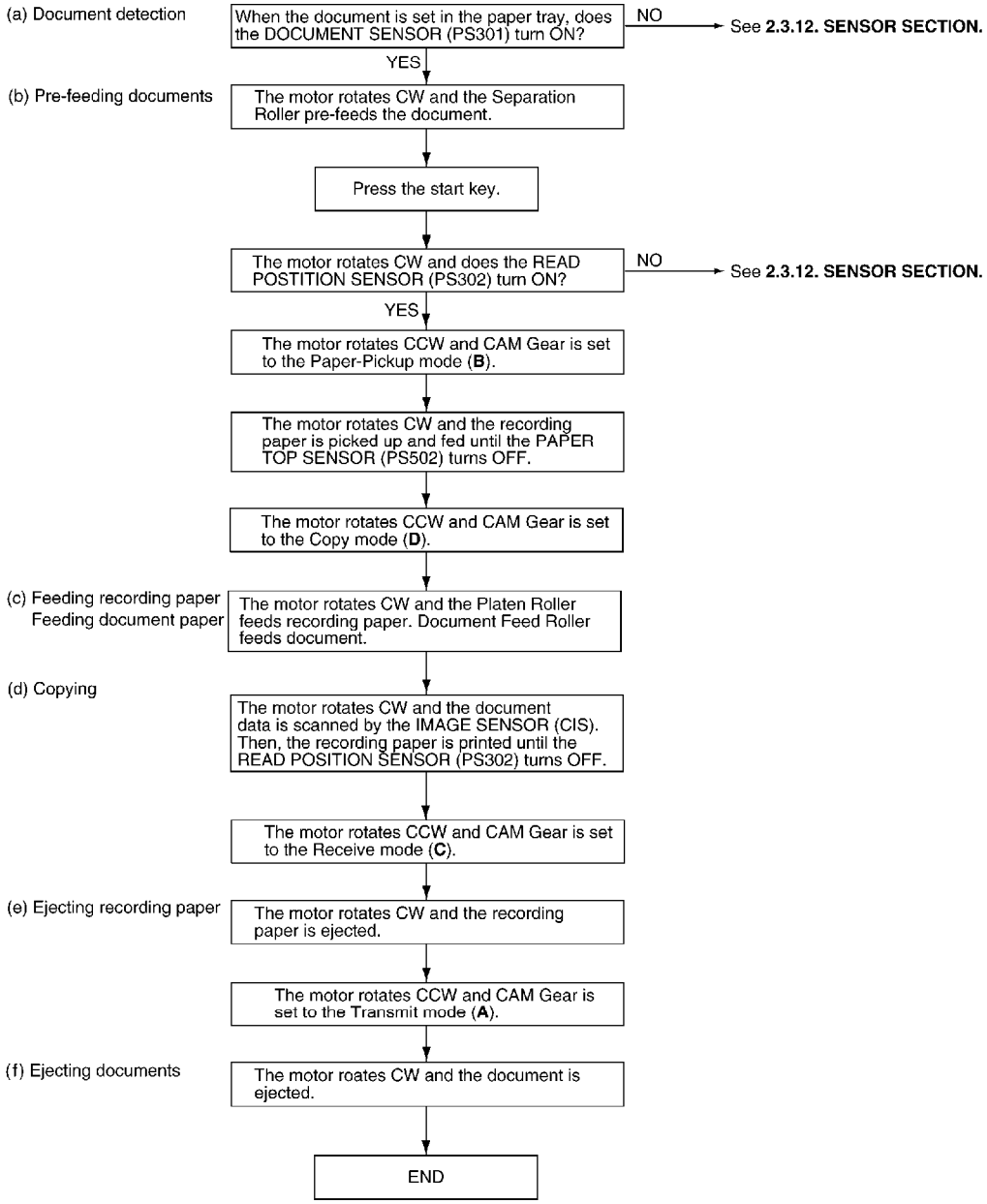
6.4.6.3.3. RECEIVING FAX


Is the recording paper is installed into the paper cassette properly?
NO
Re-install recording paper.
YES
Is the data received?
NO
Error is displayed.
YES
The motor rotates CW and CAM Gear is set to the Paper-Pickup mode (B).
The motor rotates CW and the recording paper is picked up and fed until the PAPER TOP SENSOR (PS502) turns OFF.
The motor rotates CCW and CAM Gear is set to the Received mode (C).
The motor rotates CW and the received data is printed until the FAX reception is completed.
The motor rotates CW and the recording paper is ejected.
The motor rotates CCW and CAM Gear is set to the Transmit mode (A).
END

Note:

See “Sensor Locations” in SENSORS AND SWITCHES().

6.4.6.3.4. COPYING


(a) Document detection
When the document is set in the paper tray, does the DOCUMENT SENSOR (PS301) turn ON?
NO
See 2.3.12. SENSOR SECTION.
YES
(b) Pre-feeding documents
The motor rotates CW and the Separation Roller pre-feeds the document.
Press the start key.
The motor rotates CW and does the READ POSTITION SENSOR (PS302) turn ON?
NO
See 2.3.12. SENSOR SECTION.
YES
The motor rotates CCW and CAM Gear is set to the Paper-Pickup mode (B).
The motor rotates CW and the recording paper is picked up and fed until the PAPER TOP SENSOR (PS502) turns OFF.
The motor rotates CCW and CAM Gear is set to the Copy mode (D).
(c) Feeding recording paper
Feeding document paper
The motor rotates CW and the Platen Roller feeds recording paper. Document Feed Roller feeds document.
(d) Copying
The motor rotates CW and the document data is scanned by the IMAGE SENSOR (CIS). Then, the recording paper is printed until the READ POSITION SENSOR (PS302) turns OFF.
The motor rotates CCW and CAM Gear is set to the Receive mode (C).
(e) Ejecting recording paper
The motor rotates CW and the recording paper is ejected.
The motor rotates CCW and CAM Gear is set to the Transmit mode (A).
(f) Ejecting documents
The motor roates CW and the document is ejected.
END

Note:

See “Sensor Locations” in SENSORS AND SWITCHES().

CROSS REFERENCE:
SENSOR SECTION()

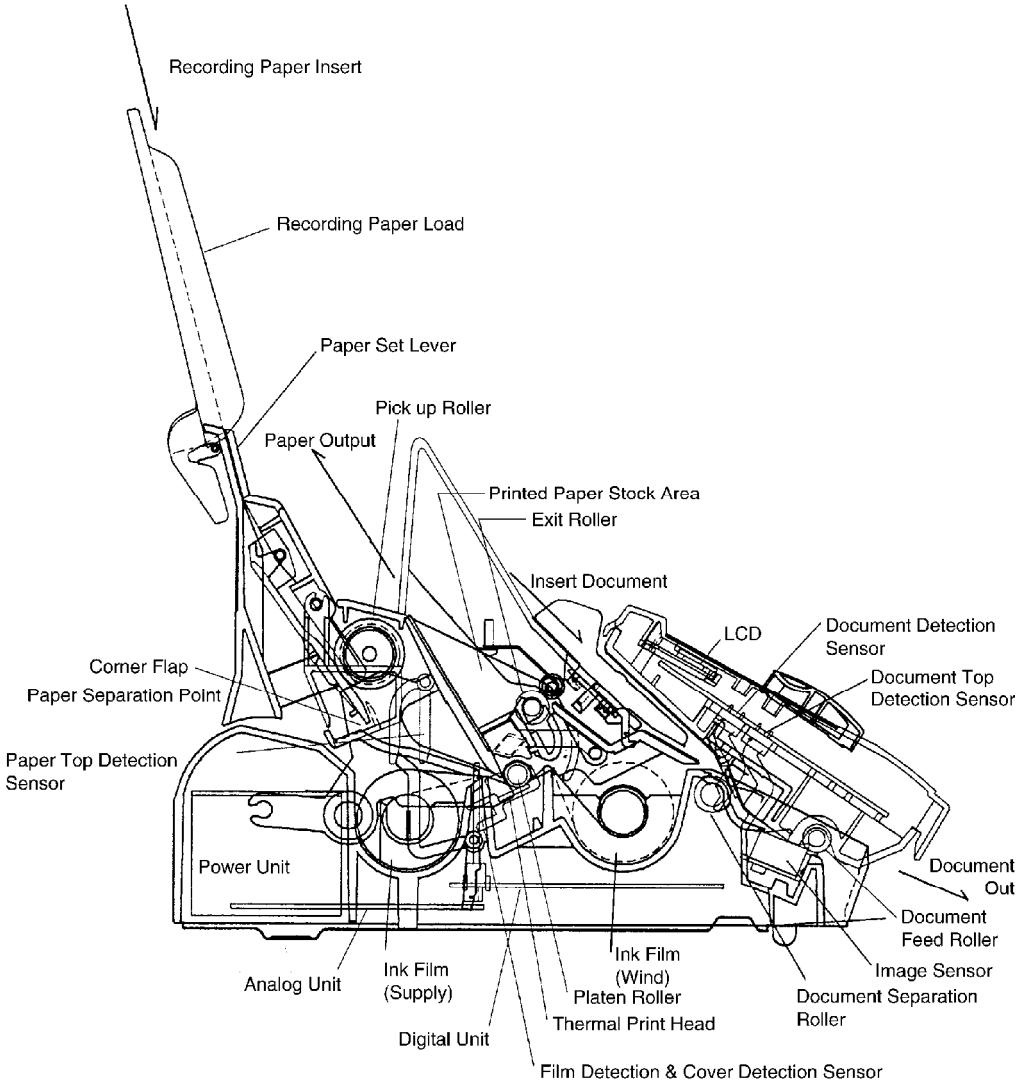
6.5. SENSORS AND SWITCHES

All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	SW352	Document set SW	[CHECK DOCUMENT]
	SW353	Document top SW	[REMOVE DOCUMENT]
Digital PCB	SW501	Film End/Cover open	[CHECK COVER] or [CHECK FILM]
	PS501	Paper Top	[PAPER JAMMED]
Anaalog P.C.B	SW102	Motor Position	————
	SW101	Hook	————

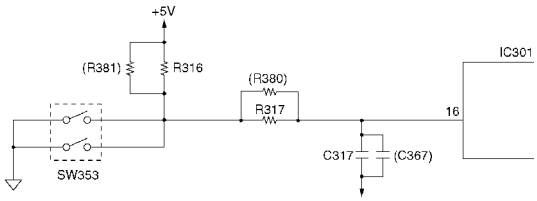
Note:
See TEST FUNCTIONS(). (#815: Sensor Check)
Refer to LCD MESSAGES (for KX-FM189S)().

Sensor Locations



1. [Document top SW (SW353)]

When a document is brought to the read position, the SW becomes ON, and the input signal of IC301-16 pin (Operation) becomes a low level. When there is no document at the read position, the SW becomes OFF, and the input signal of IC301-16 pin (Operation) becomes a high level.

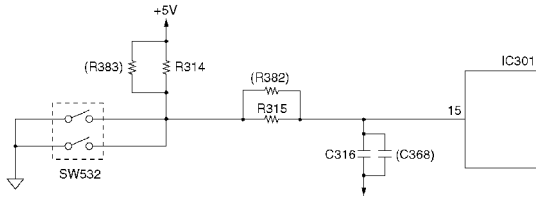


Operation Board

	Phototransistor	Signal (IC301-16 pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

2. [Document Set (SW532)]

When a document is set, the SW becomes ON, and the input signal of IC301-15 pin (Operation) becomes a low level. When there is no document, the SW becomes ON, and the input signal of IC301-15 pin (Operation) becomes a high level.

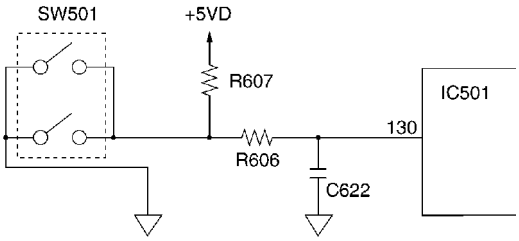


Operation Board

	Phototransistor	Signal (IC301-15 pin)
No document	OFF	High level
Set document	ON	Low level

3. [Cover Open/Film End SW (SW501)]

When the operation panel cover is closed and a film is set, the SW becomes ON, and the input signal of IC501-130 pin (Digital) becomes a low level. When the cover is opened, the SW becomes OFF, and the input signal of IC501-130 pin (Digital) becomes a high level.

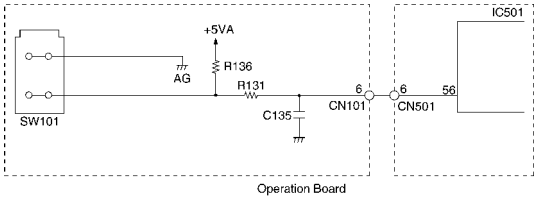


Operation Board

	Phototransistor	Signal (IC501-130 pin)
Cover open or no film	OFF	High level
Cover closed and set a film	ON	Low level

4. [Hook Switch (SW101)]

When the handset is lifted, the switch turns ON, and the signal at pin 56 of IC501 becomes low. When the handset is returned, the switch turns OFF, and the signal at pin 56 of IC501 becomes high.

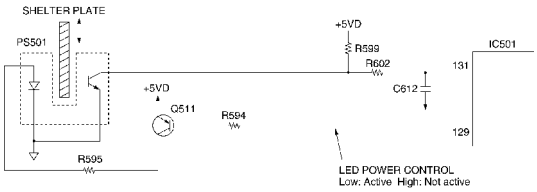


Operation Board

	SW	Signal (IC501-56 pin)
ON-Hook	OFF	High level
OFF-Hook	ON	Low level

5. [Paper top Sensor (PS501)]

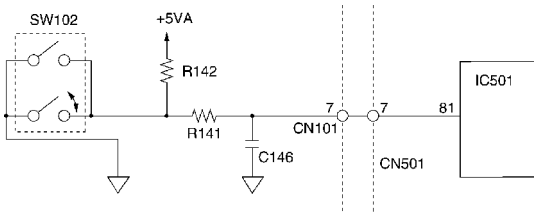
When the recording paper is loaded on the print head, the shelter plate shuts the sensor light, and the phototransistor becomes OFF. The input signal of IC501-131 pin becomes a high level. Usually, the shelter plate is lifted, the phototransistor becomes ON, and the input signal of IC501-131 pin becomes a low level.



	Phototransistor	Signal (IC501-131 pin)
Set recording paper	OFF	High level
No recording paper	ON	Low level

6. [Motor Position Sensor (SW102)]

This sensor is a detection switch for recording the position of the CAM.



Digital Board

	Signal (IC501-81 pin)
Home position	Low level
Other	High level

6.6. MODEM SECTION

6.6.1. FUNCTION

The unit uses a 1 chip modem (IC505) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.
During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC505) has hardware which sends and detects all of the necessary signals for FAX communication.
It can be controlled by writing commands from the CPU (IC501: inside ASIC) to the register in the modem (IC505).
This modem (IC505) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.
Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON CCITT (International Telegraph and Telephone Consultative Committee)
The No. XIV Group of CCITT, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)
Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines.
Determined in 1968.
Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

- Group II (G2)
Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.
Methods to suppress redundancy are not used.
Determined in 1976.

- Group III (G3)
Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.
Determined in 1980.

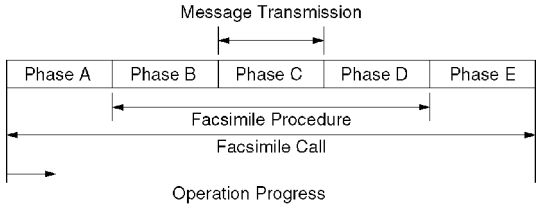
- Group IV (G4)
Transmission is via the data network. A method is provided for

suppressing redundancy in signals prior to transmission, and error -free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

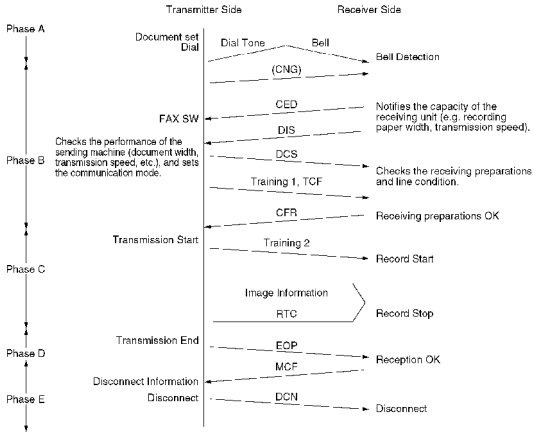
Hold time:
This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

5. Facsimile Standards

Item	Telephone Network Facsimile G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 12000, 14400bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6. Explanation of Communication and Compression Technology

a. G3 Communication Signals (T. 30 Binary Process)
For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. / An example of a binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) / Identification Signal Format.....00000001

Function: / Notifies the capacity of the receiving unit. The added data signals are as follows.

Signal.....DCS (Digital Command Signal) / Identification Signal Format.....X1000001

Example (Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0, 1, 0, 0	V.27 ter	4800 bit/s, V.27 ter
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 ter and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	V.27 ter and V.29 and V.33	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 ter and V.29 and V.33 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved

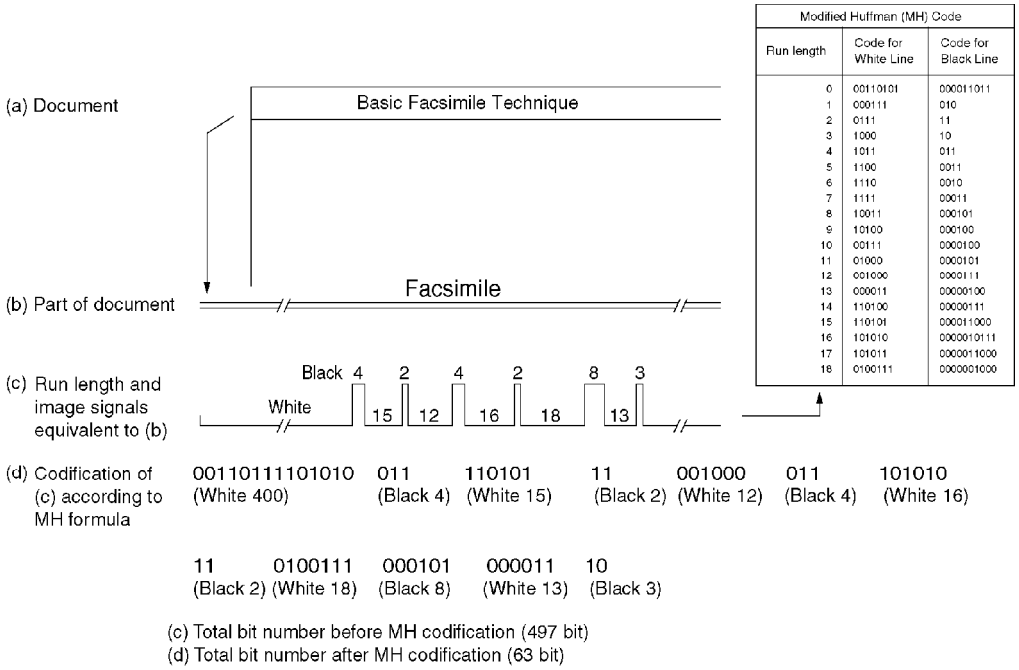
Bit No.	DIS/DTC	DCS
15	R8×7.7 lines/mm and/or 200×200 pels/ 25.4mm	R8×7.7 lines/mm and/or 200×200 p 25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capabilit
17, 18	Recording width capabilities	Recording width
(0, 0)	1728 picture elements along scan line length of 215 mm ± 1%	1728 picture elements along scan l length of 215 mm ± 1%
(0, 1)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1%	2432 picture elements along scan l length of 303 mm ± 1%
(1, 0)	2432 picture elements along scan line length of 303 mm ± 1%	2048 picture elements along scan l length of 255 mm ± 1%
(1, 1)	1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% Invalid	Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23	Minimum scan line time capability of the receiver	Minimum scan line time
(0, 0, 0)	20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	20 ms
(0, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	40 ms
(0, 1, 0)	10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	10 ms
(1, 0, 0)	5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	5 ms
(0, 1, 1)	10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 0)	20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 0, 1)	40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$	
(1, 1, 1)	0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 oc
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PST
31	T.6 coding capability	T.6 coding enabled

Bit No.	DIS/DTC	DCS
32	Extend field	Extend field
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits Recording width indicated by this information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 pictu elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 pictur elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.
Note 3 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	————————	A fixed pattern is transmitted to the receiving at a speed (2400 to 14400 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this si
TCF (Training Check)	————————	Sends 0 continuously for 1.5 seconds at the s speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly recei FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmi speed by one stage and initiates training onc again.
Training 2	————————	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	————————
RTC (Return to Control)	————————	Sends 12 bits (0...01 × 6 times) to the receiver the same speed as the image signal and notif completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there still more documents to be sent, they are outp instead of EOP. After MCF reception, the send transmits an image signal of the second shee
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is receiv

b. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.


(a) Document
Basic Facsimile Technique
(b) Part of document
Facsimile
(c) Run length and image signals equivalent to (b)
Black 4 2 4 2 8 3
White 15 12 16 18 13
(d) Codification of (c) according to MH formula
00110111101010 (White 400)
011 (Black 4)
110101 (White 15)
11 (Black 2)
001000 (White 12)
011 (Black 4)
101010 (White 16)
11 (Black 2)
0100111 (White 18)
000101 (Black 8)
000011 (White 13)
10 (Black 3)
(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

Modified Huffman (MH) Code

Run length	Code for White Line	Code for Black Line
0	00110101	0000110111
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

6.6.2. MODEM CIRCUIT OPERATION

The modem (IC505) has all the hardware satisfying the CCITT standards mentioned previously. When the ASIC IC501 (77) is brought to a low level, the modem (IC505) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC501) ADR0-ADR4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC501) according to CCITT procedures. The INT signal dispatched from IRQ1, 2 (pins 108 and 121 of IC505) to ASIC (IC501) when the transmission data is accepted and the received data is demodulated, the ASIC (IC501) implements post processing. This modem (IC505) has an automatic application equalizer.

With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC505) operates using the 32.256 MHz clock (X503).

1. Facsimile Transmission

The digital image data on the data bus is modulated in the modem (IC505), and sent from pin 69 via Analog ASIC IC514, amplifier IC101 and the NCU section to the telephone line.

Refer to CHECK SHEET().

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 60 of the modem (IC505). The signals that enter pin 60 of the modem (IC505) are demodulated in the board to digital image signals, then placed on the data bus.

In this case, the image signals from the telephone line are

transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.
This is designed to correct the characteristics of the frequency band centered about 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.
Refer to CHECK SHEET().

3. DTMF Transmission (Monitor tone)
The DTMF signal generated in the modem (IC505) is output from pin 69, and is then sent to the circuit on the same route as used for facsimile transmission.
Refer to CHECK SHEET().
(DTMF Monitor Tone)
Refer to CHECK SHEET().

4. Call Tone Transmission
This is the call signal which is generated in the ASIC (IC501) and sent to the speaker.
Refer to CHECK SHEET().

5. Busy/Dial Tone Detection
The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC505) becomes 1, and this status is monitored by the ASIC (IC501).

6. Caller ID Detection
The caller ID signal which is received from the telephone line/ passes through the monitor trans T102 and Analog ASIC (IC514). And it enters pin 62 of the modem (IC505).
Refer to CHECK SHEET().

6.7. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. Function
The analog section serves as an interface between the telephone line. The digital board (IC505) for transmission and reception of FAX signals, switches between the digital board (IC505) and other sections by means of a Analog ASIC (IC514) in the NCU section. The control signals to the individual analog sections are output mainly from ASIC IC501, and the status information for the various

sections is also held in ASIC IC501. / Simple explanations for the various sections are given below.

2. Circuit Operation

[NCU Section]
This is the interface between the telephone line and external telephone. This is composed of a bell detection circuit, pulse dial generation circuit, amplifier circuit for line transmission and reception, sidetone circuit, etc. /

[Modem (IC505)]
This is used for FAX signal tone modulation, DTMF signal transmission, ring tone generation, and line transmission beep generation. The DTMF signal and beep are placed into the TX system. The ring tone passes through the analog ASIC(IC514) and is output to the speaker via the power amplifier (IC102).

6.7.1. ANALOG UNIT BLOCK DIAGRAM

6.8. NCU SECTION

6.8.1. GENERAL

NCU is the interface with the telephone line. It is composed of Remote FAX activation circuit, Bell detection circuit, Pulse dial circuit, CPC detection circuit, Line amplifier and sidetone circuits. The following is a brief explanation of each circuit.

6.8.2. REMOTE FAX ACTIVATION CIRCUIT

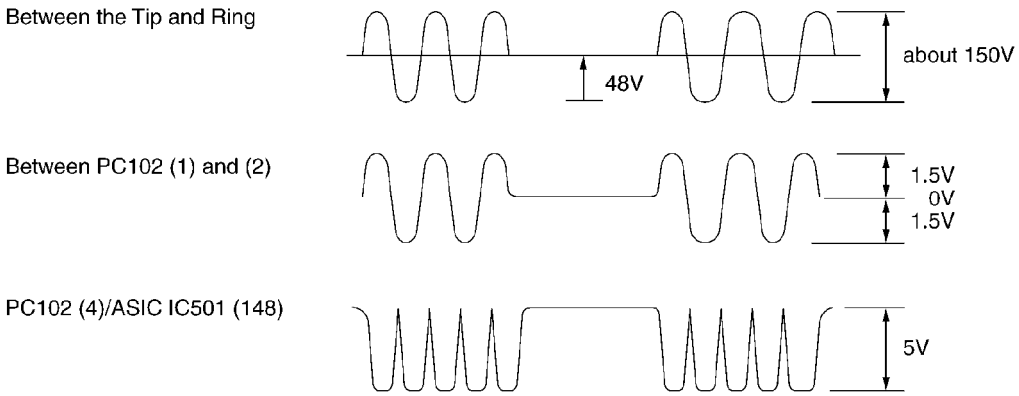
1. Circuit Operation

After detecting the bell signal, another telephone connected to the same line switches to the FAX mode by DTMF signal.
TEL LINE → T102 → CN106 (3) → {CN507(3) → R640 → C630 → R581 → IC514 (20-31) → C631 → IC522 → R624 → IC501 (21)}

6.8.3. BELL DETECTION CIRCUIT

1. Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 148 of ASIC IC501 on the digital board is illustrated.



TEL LINE → PC102 (1, 2 → 4) → IC501 (148): Bell

6.8.4. PULSE DIAL CIRCUIT AND ON/OFF HOOK CIRCUIT

6.8.4.1. For KX-FM189BL

While OFF-HOOK, RL101 is ON. Q115 turns on by pin (18) of IC501 as well. On the other hand, while ON-HOOK, Q115 turns OFF by pin (18) of IC501, then the line turns OFF. ON/OFF-HOOK, controlled by pin (18) of IC501, makes the pulse dial operation possible.

IC501 (18) LINE RLY Low Level → CN501 (3) → CN101 (3) → Q115 OFF → RL101 OFF : DC Loop OFF

IC501 (18) LINE RLY High Level → CN501 (3) → CN101 (3) → Q115 ON → RL101 ON : DC Loop ON

6.8.4.2. For KX-FM189S

While OFF-HOOK, RL101 is ON. Q116 turns on by pin (52) of IC501 as well. On the other hand, while ON-HOOK, Q116 turns OFF by pin (52) of IC501, then the line turns OFF. ON/OFF-HOOK, controlled by pin (52) of IC501, makes the pulse dial operation possible.

IC501 (52) Low Level (Make) → CN507 (5) → CN106 (5) → PC105 ON (Make) → Q116 ON (Make) → TEL LINE

IC501 (52) High Level (Break) → CN507 (5) → CN106 (5) → PC105 OFF (Break) → Q116 OFF (Break) → TEL LINE

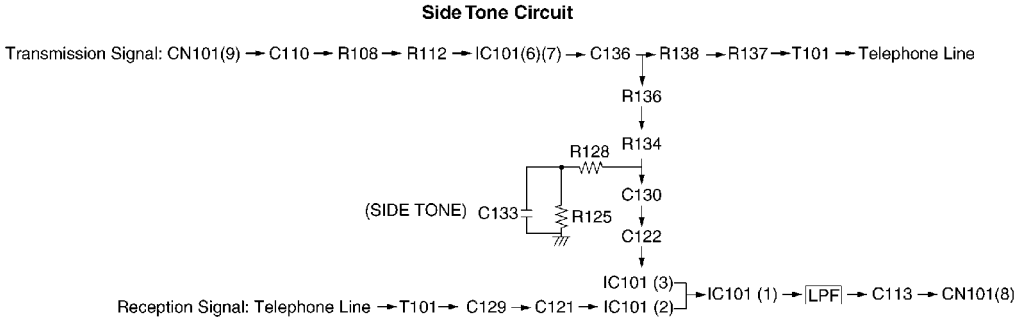
6.8.5. LINE AMPLIFIER AND SIDE TONE CIRCUIT

1. Circuit Operation

The reception signal output from the line transformer T101 is input to pin (2) of IC101 via C129, C121, C119 and R113 and then the signal is amplified at pin (1) of IC101 and sent to the reception system at 8.5dB.

The transmission signal goes through C110, R108 and R112 and enters IC101-pin (6), where the signal is amplified to about 20.8dB. Then, it is output from pin (7) of IC101 and transmitted to T101 via C136, R138 and R137. If the side tone circuit is not applied, the transmission signal will return to the reception amplifier via C129, C121, C119 and R113. When the side tone circuit is active, the signal output from IC101 pin (1) passes through C136, R136, R134,

C130 and C122 and goes into the amplifier IC101 pin (3). This circuit is used to cancel the transmission return signal.


Side Tone Circuit
Transmission Signal: CN101(9) → C110 → R108 → R112 → IC101(6)(7) → C136 → R138 → R137 → T101 → Telephone Line
R136
R128
R134
C130
(SIDE TONE) C133
R125
C122
IC101 (3)
Reception Signal: Telephone Line → T101 → C129 → C121 → IC101 (2)
IC101 (1) → LPF → C113 → CN101(8)

6.8.6. CPC (Calling Party Control) DETECTION CIRCUIT

1. Function

This circuit detects the signal (cuts the current) output from the converter when the other party finishes ICM recording and goes into the ON-HOOK status.

TAD detects this signal and disconnects the line. When the TAD is operating, pin (4) of PC107 becomes a low level.

While detecting the CPC signal, pin (4) of PC107 becomes a high level. When the CPC signal is detected, the TAD operation stops and the line is disconnected.

6.8.7. AUTO DISCONNECT CIRCUIT

1. Function

This circuit is used to detect that the telephone connected in parallel to the same line is OFF-hook while the unit picks up the line. If this detection circuit is activated when TAM is being delivered, the delivery stops and the circuit is automatically released.

2. Circuit Operation

If the line is picked up, C173 is charged by following the path shown below.

D6 (+) → R189 → D115 → C173

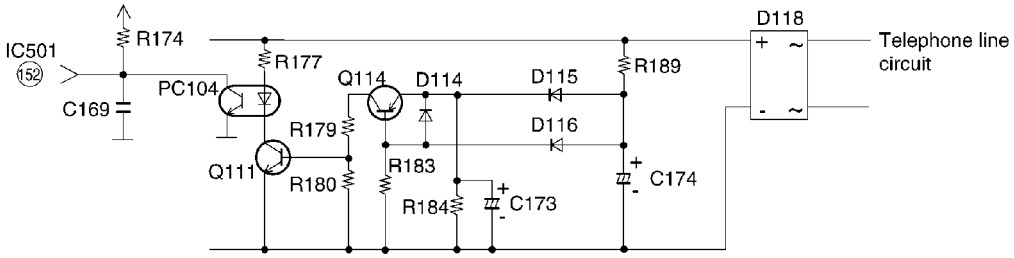
When the electric potential difference between the base and emitter of Q114 becomes less than about 0.3V, Q114 and Q111 and PC104 turn off, then the IC501 pin 152 becomes a high level.

In this condition, if a telephone connected in parallel goes into OFF -hook status, the base of Q114 becomes low. On the other hand,

the emitter of Q114 goes down because the capacitor (C173) is charged. Q114 turns on when the electric potential difference between the base and emitter of Q114 becomes more than 0.6 V while being charged.

When Q114 turns on, Q111 and PC104 also turn on, then the IC501 pin 152 becomes a low level.

Circuit Diagram



6.8.8. CALLING LINE IDENTIFICATION CIRCUIT

6.8.8.1. FSK TYPE (for KX-FM189BL only)

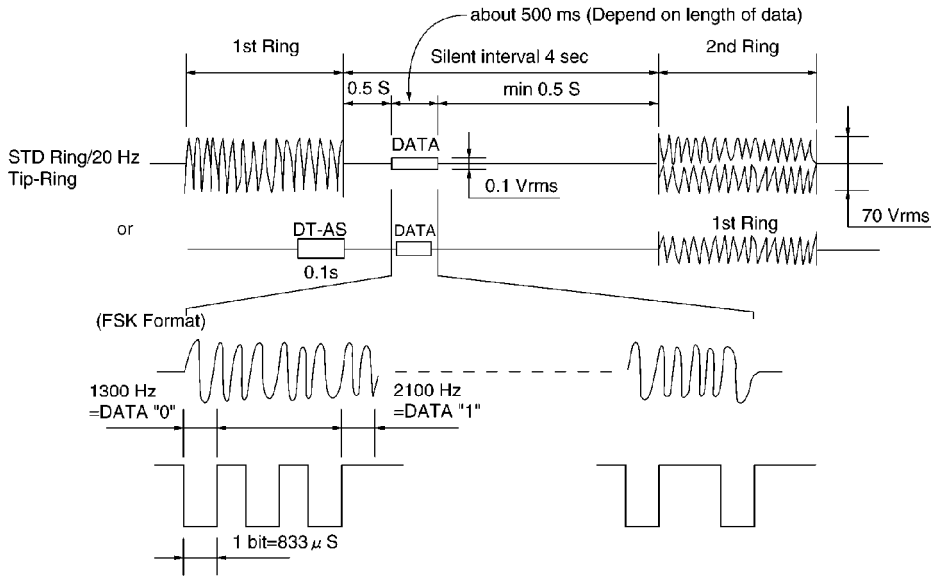
1. Function

This unit is compatible with the Caller ID service offered by your local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal or between the DT-AS (Dual Tone-Alert Signal) and the first ring. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data "0" is a 1300 Hz sine wave, and data 1 a 2100 Hz sine wave. / There are two type of the message format which can be received:i.e.the single data message format and multiple data message format. / The multiple data format allows to transmit the name and data code information in addition to the time and telephone number data. / When there is multiple data in the unit, the name or telephone number are displayed.

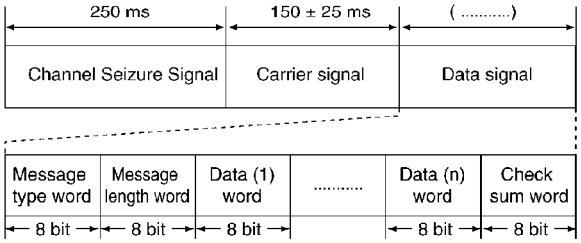
2. Circuit Operation:

The caller ID signal input from TEL LINE is processed with MODEM (IC505). / Refer to ANALOG BOARD SECTION() for the route of caller ID signal(FSK).

Timing Chart

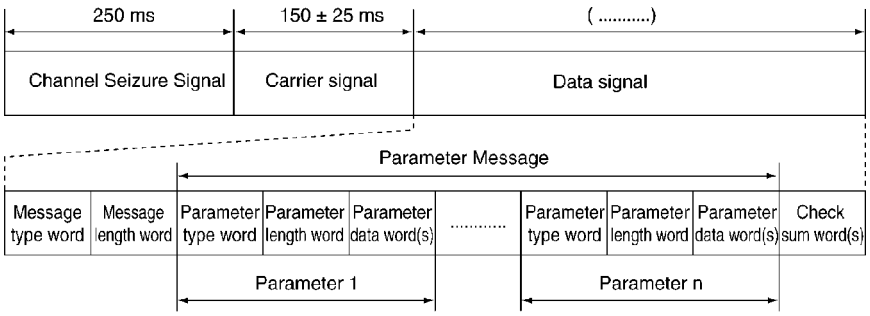


• Single data message



•1 word = All 8 bit data
•Message Type Word = Fixed value "00000100"
•Message Length Word = number of the data word
•Data word = The data value (month, day, hour, minute, telephone number)

· Multiple data message



·1 word = All 8 bit data
·Message Type = Fixed value "10000000"
·Message Length Word = number of the Parameter Message word
·Parameter Type Word = Kind of data (ex. the time, phone number)
·Parameter Length Word = number of the Parameter data word
·Parameter Word (s) = the data value

6.8.8.2. DTMF TYPE (for KX-FM189S only)

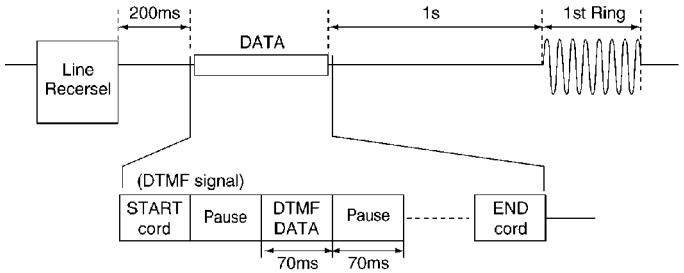
1. Function

This unit is compatible with the Caller ID service offered by your

local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent before the first rings of the bell signal. The data from the telephone exchange is a DTMF signal.

2. Circuit Operation:

The caller ID signal input from TEL LINE is received by DTMF receiver (IC522). / Refer to ANALOG BOARD SECTION() for the route of caller ID signal (DTMF).



(DTMF Signal)

Hz	1209	1336	1477	1633
697	1	2	3	A
770	4	5	6	B
852	7	8	9	C
941	#	0	*	D

Different stages of implementation are anticipated. The following two examples show the possible series of DTMF codes that are sent by the network.

EXAMPLE 1:	**Transfer of Calling Line Identity**	
	<D><S1>...<Sn><C>	
	_----------	**digit transmission sequence**
	<C>	**DTMF code "C" (end code)**
	<D>	**DTMF code "D" (start code)**
	<S1>...<Sn>	**Digits (0-9)**
EXAMPLE 2:	**Transfer of Calling Line Identity and subsequent identities**	
	<A><S1>...<Sn><D><S1>...<Sn><B><S1>...<Sn><C>	
	_----------	**digital transmission sequence**
	<A>	**DTMF code "A" (start code calling party number)**
	<B>	**DTMF code "B" (see below)**
	<C>	**DTMF code "C" (end code)**
	<D>	**DTMF code "D" (start code call diversion number)**
	<S1>...<Sn>	**Digits (0-9)**

The DTMF code “B” may be sent by the network as start code for the transfer of information values, through which special events can be indicated to the user. / / The overdecadic DTMF digits “A”, “B”, “C” and “D” shall not be presented.

6.9. ITS (Integrated telephone System) and MONITOR SECTION

6.9.1. GENERAL

The general ITS operation is performed by the special IC505 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC501 (digital board). During the pulse dial operation, the monitor tone is output from the ASIC IC501.

6.9.2. SPEAKER PHONE CIRCUIT

1. Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2. Circuit Operation

The speakerphone can only provide duplex.

3. Signal path

Refer to CHECK SHEET().

6.9.3. HANDSET CIRCUIT

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal path

Refer to CHECK SHEET().

6.9.4. MONITOR CIRCUIT FOR EACH SIGNALS

1. Function

This circuit monitors various tones, such as 1 DTMF tone, 2 Alarm/ Beep/Key tone/Bell 3 Dummy ring back tone.

2. Signal path

Refer to CHECK SHEET().

6.10. ATAS (Automatic Telephone Answering System) SECTION

1. Function

The ATAS main operation is performed by the special IC505 (MODEM). IC512 (FLASH MEMORY)'s control signals are input from ASIC IC501.

A. Greeting/Message Recording

B. ICM Recording

C. Greeting/Message/ICM play to speaker

D. Greeting/Message/ICM play to Tel Line

E. Vox Detection

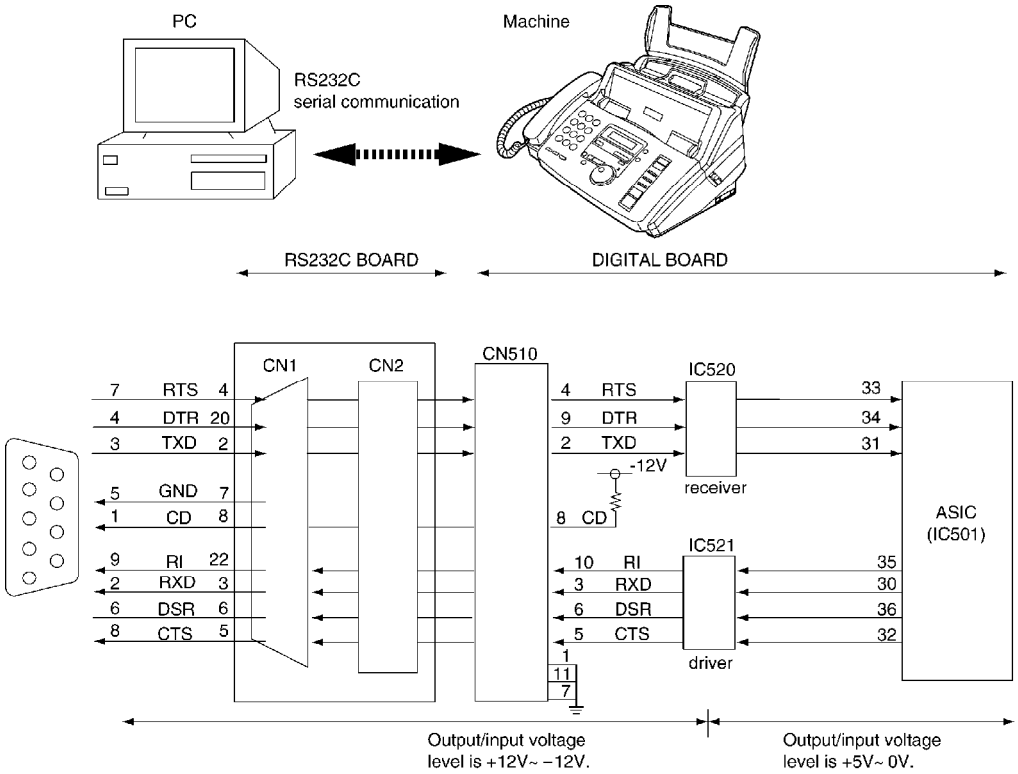
2. Signal Path

Refer to CHECK SHEET().

6.11. RS-232C SECTION (RS-232C serial communication)

6.11.1. OUTLINE

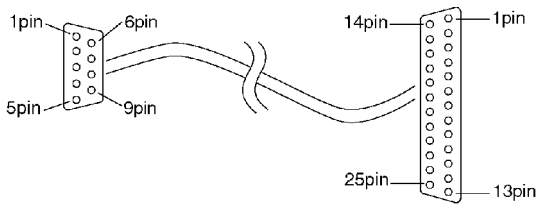
The model has a communication port designed for RS-232C serial communication. (The EIA Standards specify the interface cable type (No. RS232C) and the voltage levels.
You can connect the FAX machine to a printer (200dpi), scanner and fax modem with the interface cable and the attached software CD-ROM. This PC interface enables you to store the transmitted/received data into memory (on you PC hard disk) and to manage the data as file.



6.11.2. ELECTRICAL SPECIFICATIONS

Electrical specifications	
Output voltage level	±12V spece -12V mark
Output imperdance	Ro > 300 Ω (Excepting CD: 2kΩ)
Input imperdance	7kΩ > Ri > 3kΩ
Communication speed	~19.2kbps

6.11.3. CABLE



Use modem cable or RS-232C data communication cable.
(Cable type is specified in Operating Instructions..)

Note:

The open circuit driver voltage (output) of this set is +12V ~ -12V. The minimum input signal voltage must fall outside the transition region of ±3V.
The output voltage range that is terminated with a load between 3kW and 7kW will be between ± 5V and ±12V.

6.12. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC501: on the DIGITAL BOARD). (Fig.-a) / The key matrix table is shown below.

Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6
KSL0		SW306 MENU	SW311 9	SW316 *	SW321 RECORD	SW326 0	SW331 ERASE
KSL1	SW302 HELP	SW307 MUTE	SW312 5	SW317 4	SW322 6	SW327 PLAY MESSAGE	
KSL2	SW303 VOL UP	SW308 COLLATE	SW313 2	SW318 1	SW323 RESOLUTION	SW328 CALLER ID	SW333 3
KSL3	SW304 VOL DOWN	SW309 QUICK SCAN	SW314 COPY/START/SET	SW319 REDIAL/PAUSE	SW324 SP-PHONE	SW329 RECALL	SW334 STOP
KSL4	SW305 AUTO ANSWER		SW315 8	SW320 7		SW330 DIRECTORY PROGRAM	SW335 #

XL

	XL12	XL11
	DOCUMENT SET	DOCUMENT TOP

LED

	LED2	LED3	LED4
			PLAY MESSAGE

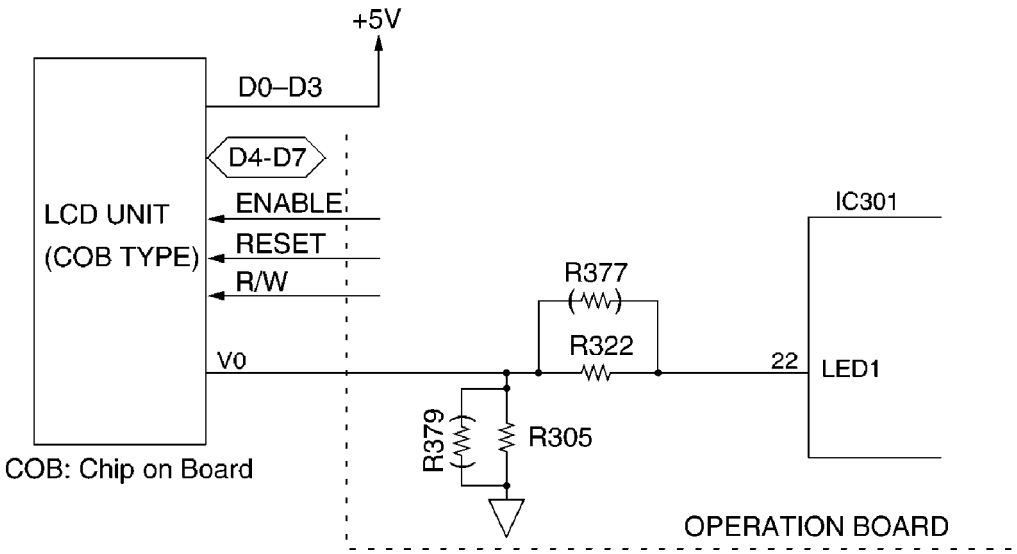
Note:
Refer to BUTTON NAME (for KX-FM189S)().

6.13. LCD SECTION

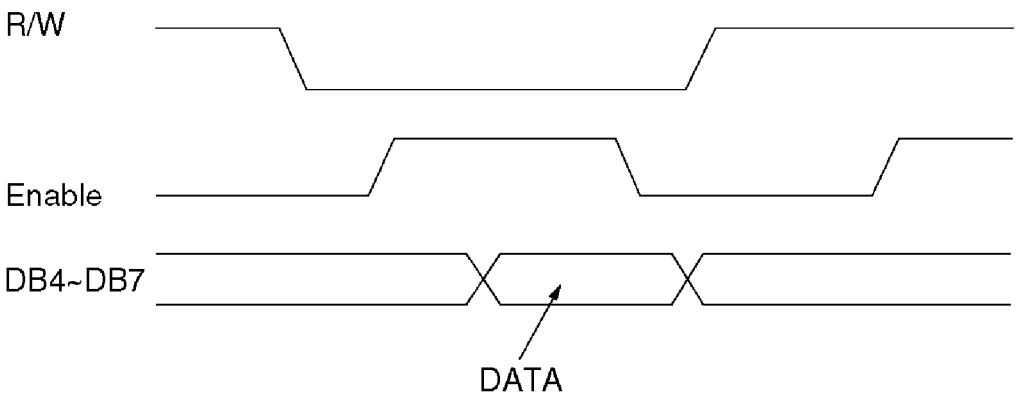
The Gate Array (IC301) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.
R303(R377) and R305(R379) are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram



Timing Chart

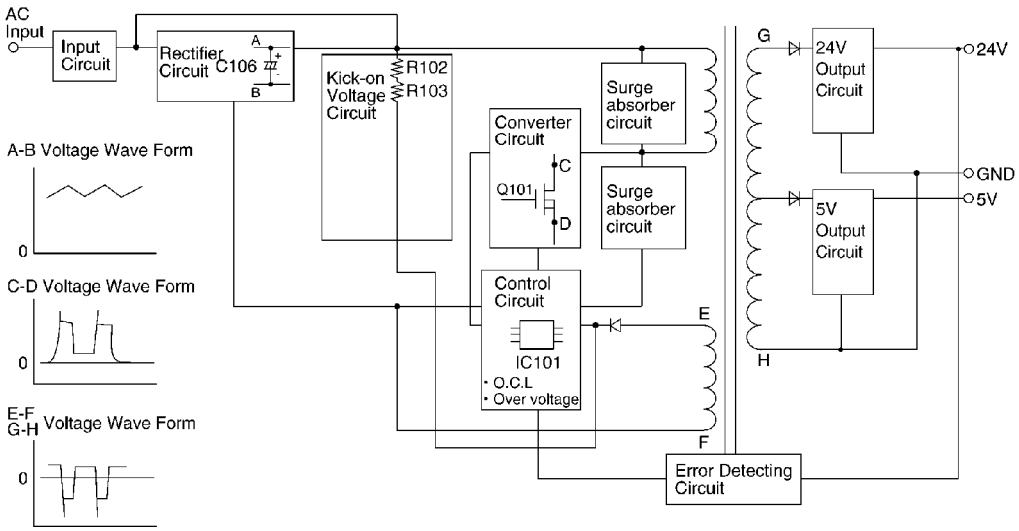


Density	Normal	Dark
LED1 (IC301-22pin)	H	L

6.14. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



[Input Circuit]

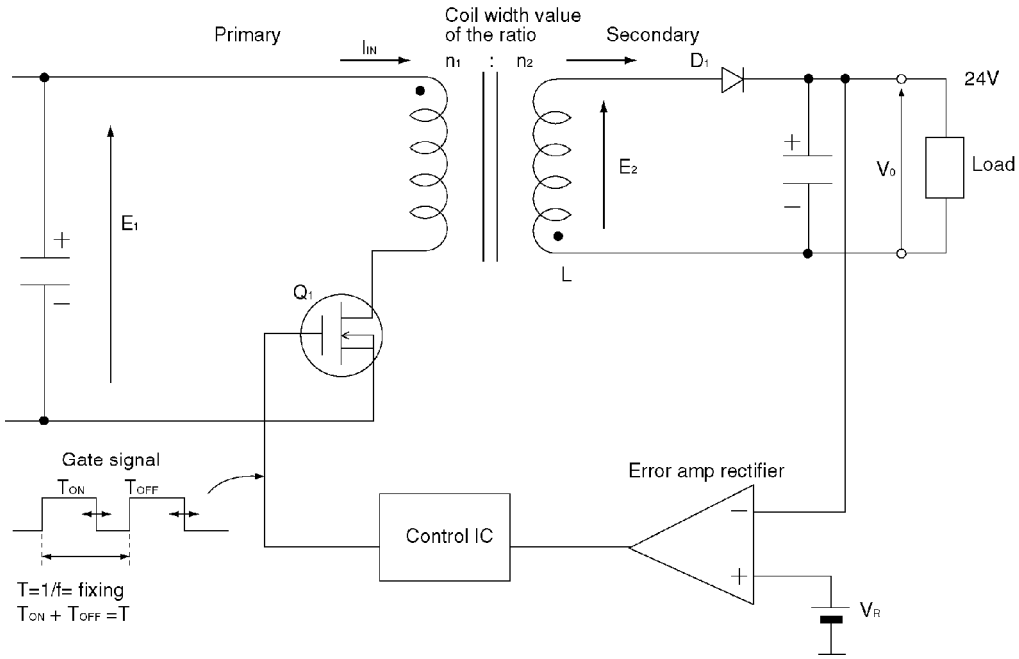
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



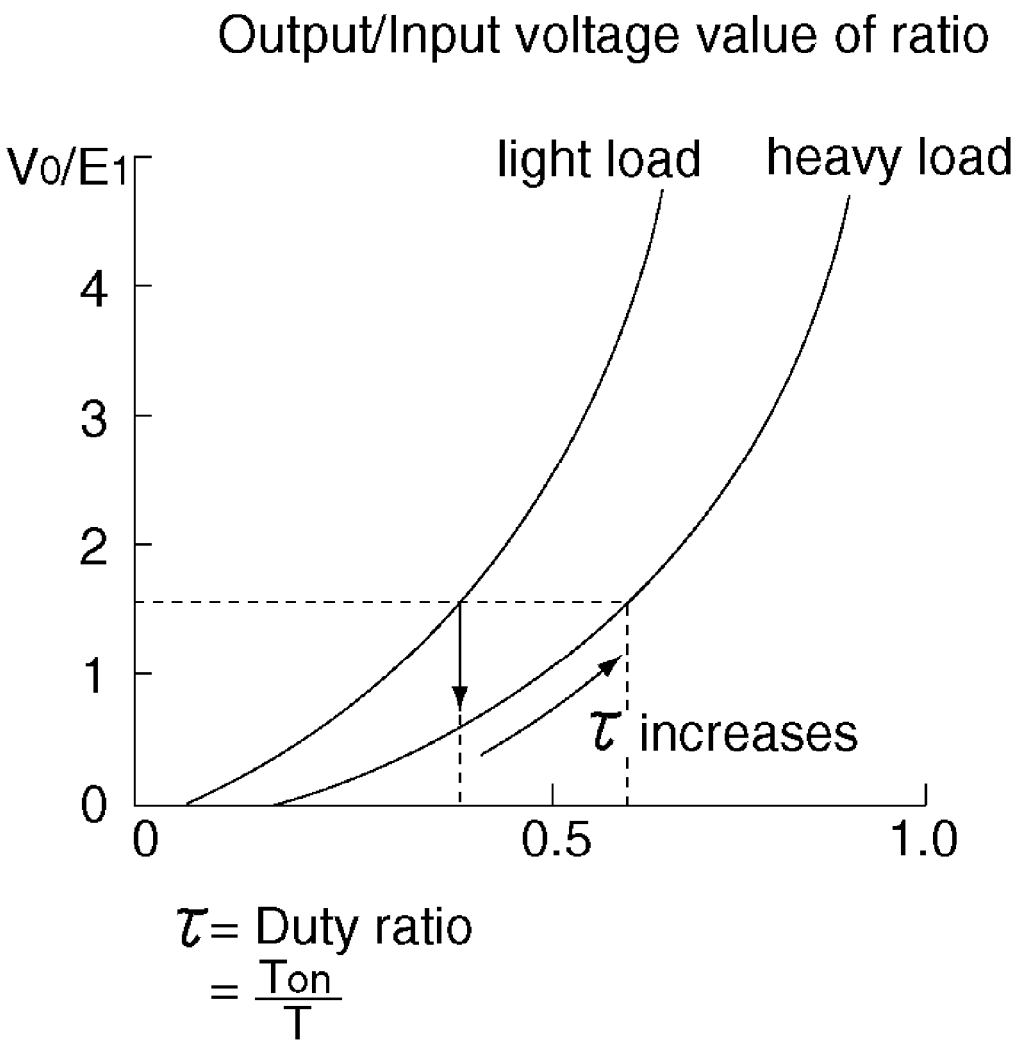
The following is an overview of how the power supply unit is controlled.

The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transfer as follows.

L → D_1 → Load → L

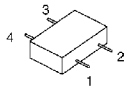
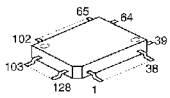
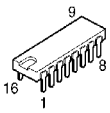
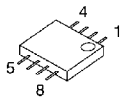
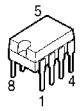
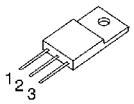
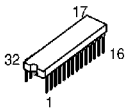
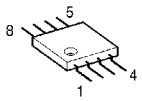
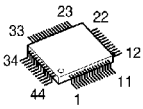
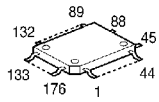
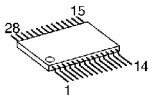
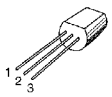
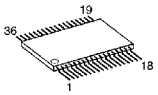
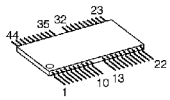
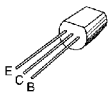
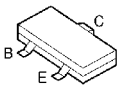
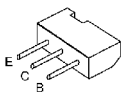
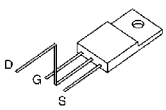
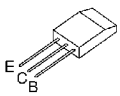
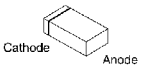
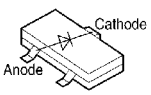
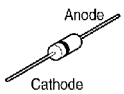
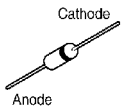
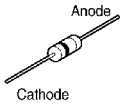
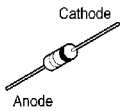
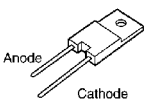
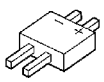
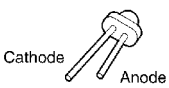
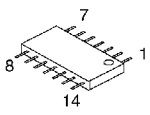
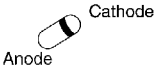
Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.
Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.



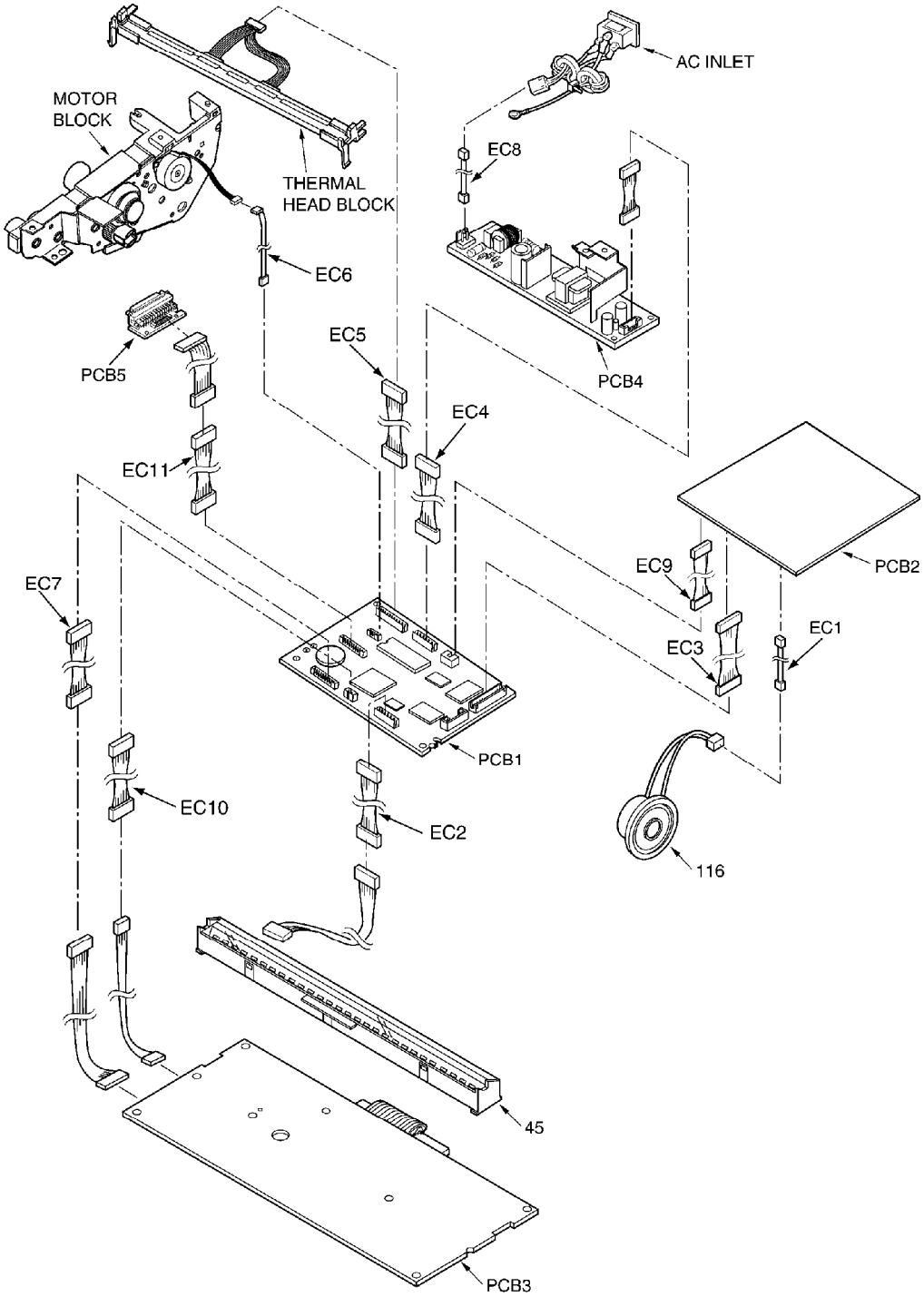
[Surge Absorber Circuit]
This circuit is for absorbing surge voltage generated by the transformer.
[Control Circuit and Detecting Circuit]
The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.
In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.
When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.
[Over Current Limiter (O.C.L)]
The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is

limited by this circuit.
[Over Voltage Circuit]
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.
Dummy load method (to quickly check the power supply output)
Refer to POWER SUPPLY BOARD SECTION().

7. TERMINAL GUIDE OF THE IC'S TRANSISTORS AND DIODES

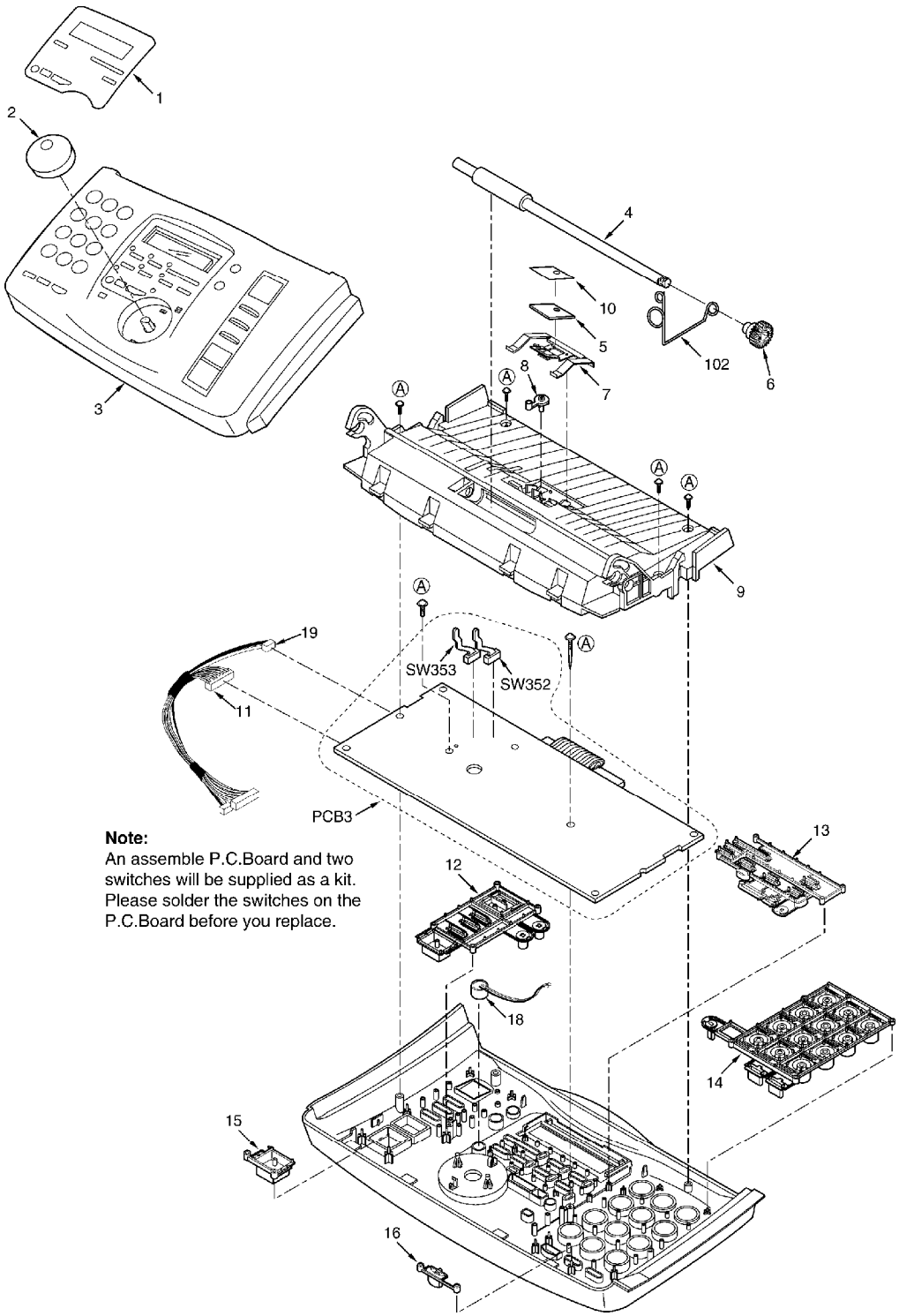
 PFVIXCN4202N	 PFVIR675813	 PFVIT2003APS	 PFVTSI4431DY	 PFVIFA5317P PQVIMT3274AE
 PQVITA7805F	 PFWIFM189BL PFWIFM189S	 AN6183SE1 PQVINJM2904M PQVINJM2113M PFVINJM082BM	 MN7D032Z9J	 PFVIM66429M1
 PFVIM0525LFF PFVIMS5148EF	 AN1431T	 AN6383SB	2SD874A PFVIMM1385EN	 PFVIKM29W4AT
 2SC2235	 PQVTDTC143E PQVTDTC114EU 2SD1994A 2SB709A, 2SC4155S 2SC4155R, 2SB1218A	 2SB1322	 2SK2651	 2SA1627
 MA143	 MA141WK	 PQVDERA1802 PFVDEG01C, MA165	 1SS119	 MA7160, PFVD1N4005 MA4220, PFVDD1NL20U
 PFVDRMRLS245, MA700A PQVDHZS2B1, MA4056	 PFVDSF5LC20U	 PQVDDGS1ZB60	 LNJ801LPDJA	 PFVISN75189A PFVISN75188E
 RLS71				

8. FIXTURES AND TOOLS

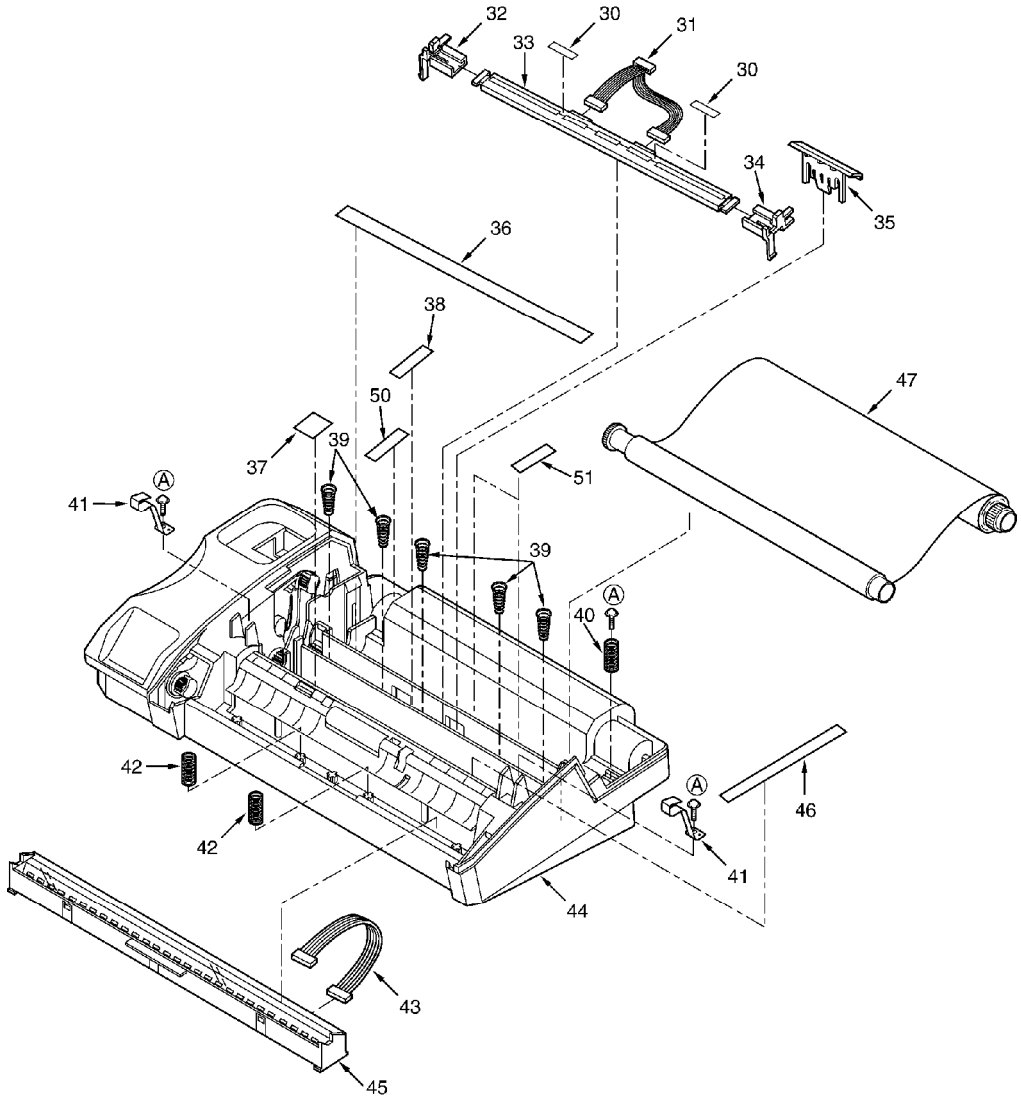


9. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

9.1. OPERATION PANEL SECTION

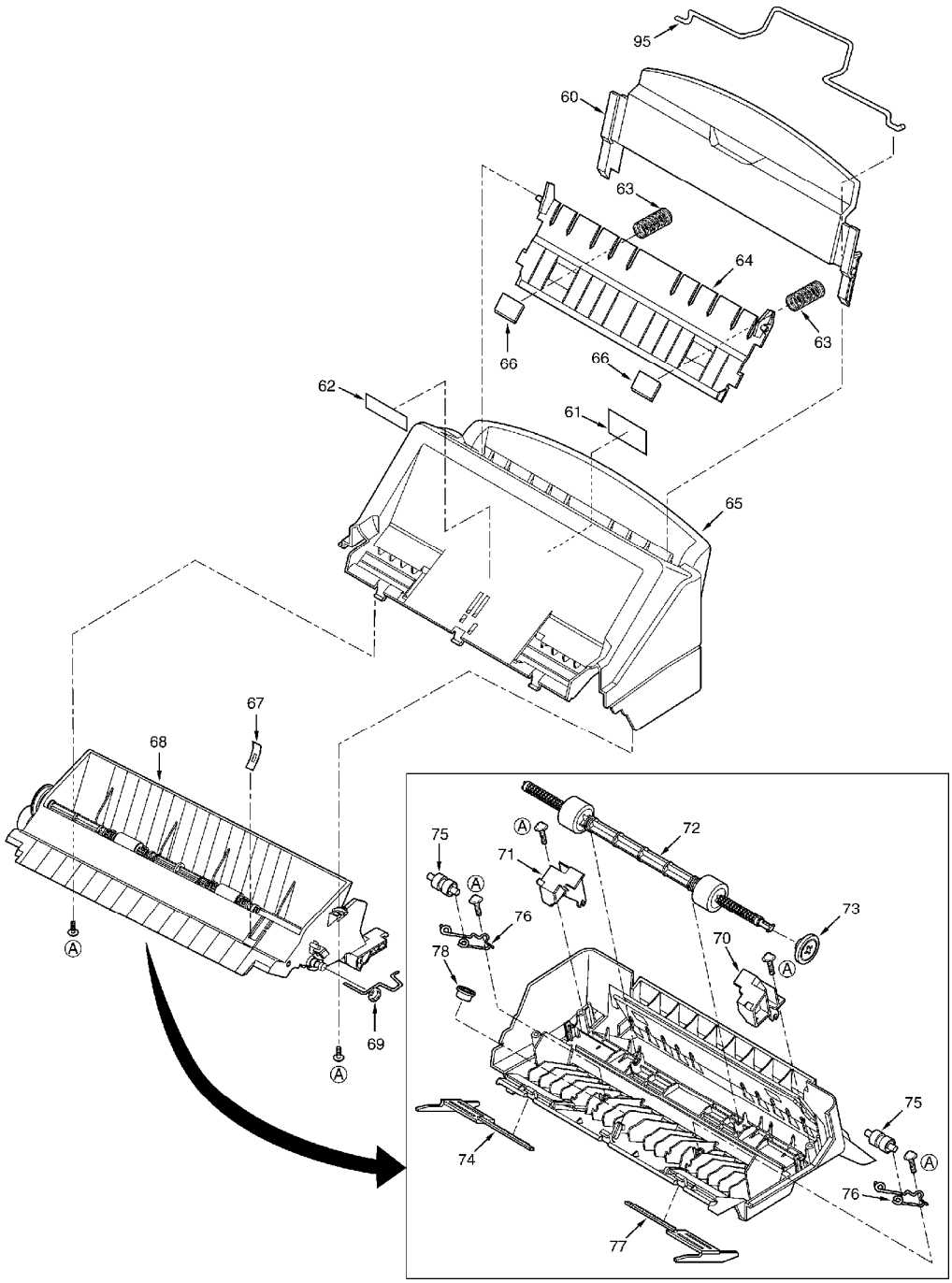


9.2. UPPER CABINET SECTION

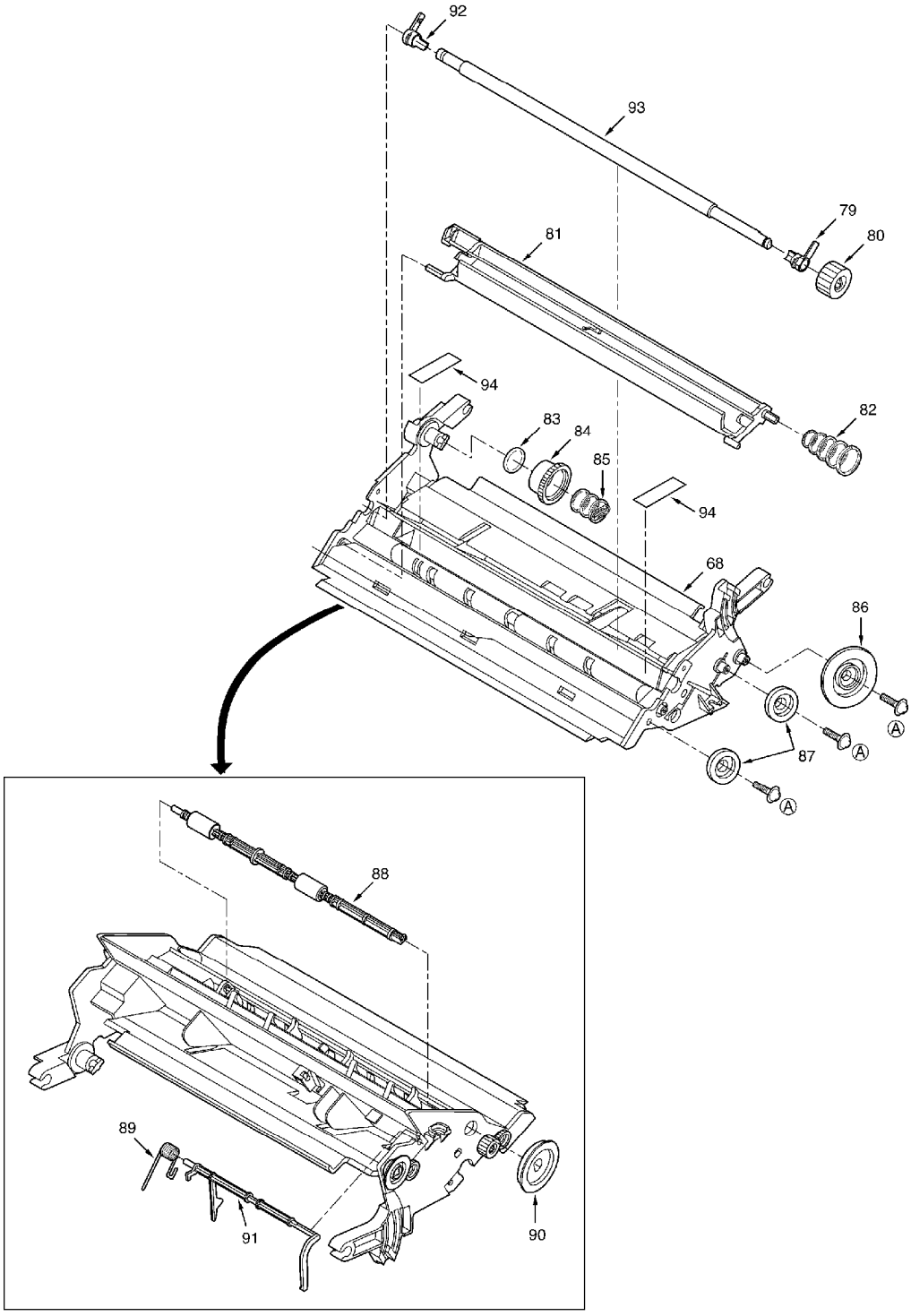


9.2.1. BACK COVER SECTION

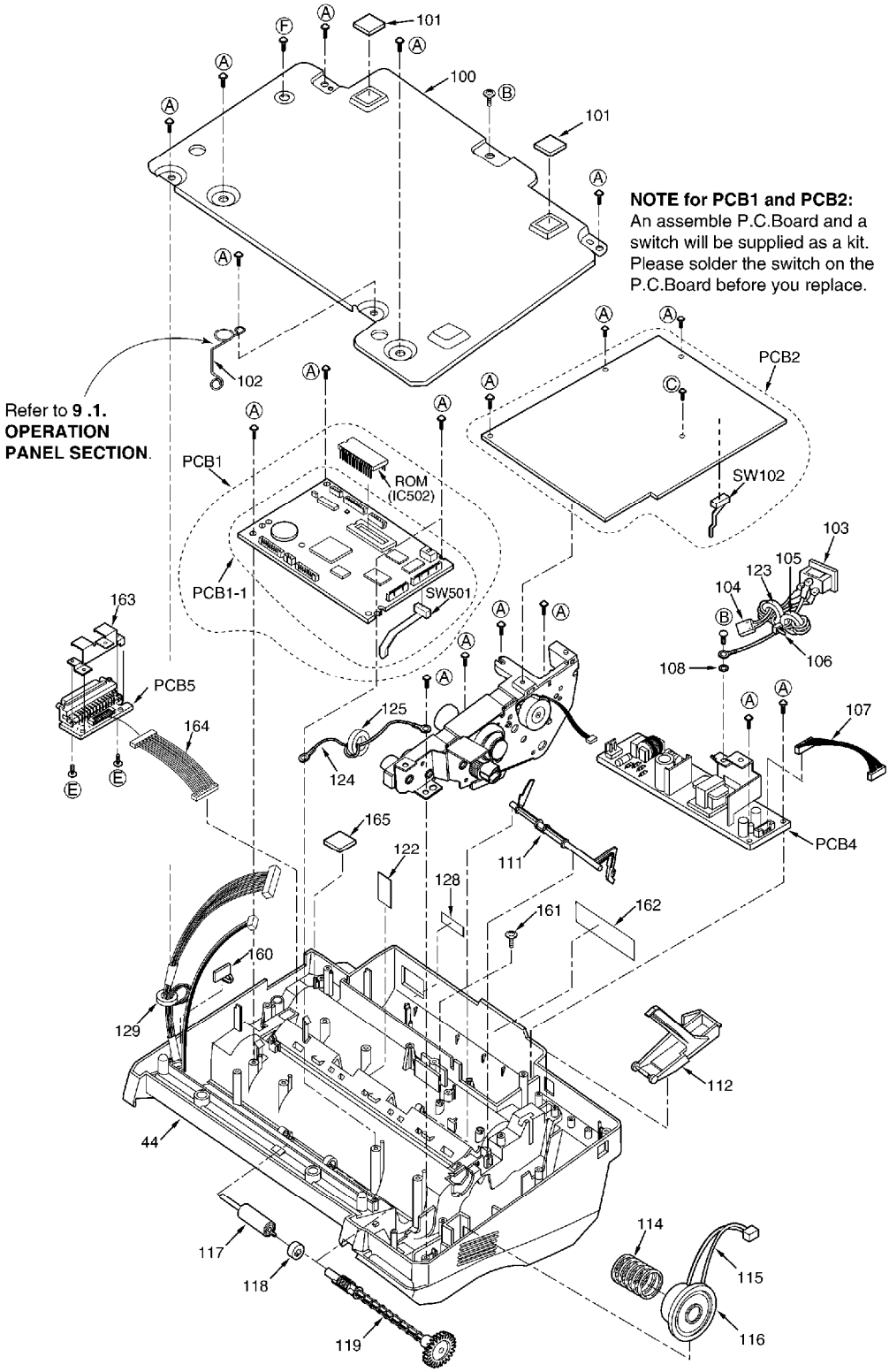
9.2.1.1. BACK COVER 1



9.2.1.2. BACK COVER 2

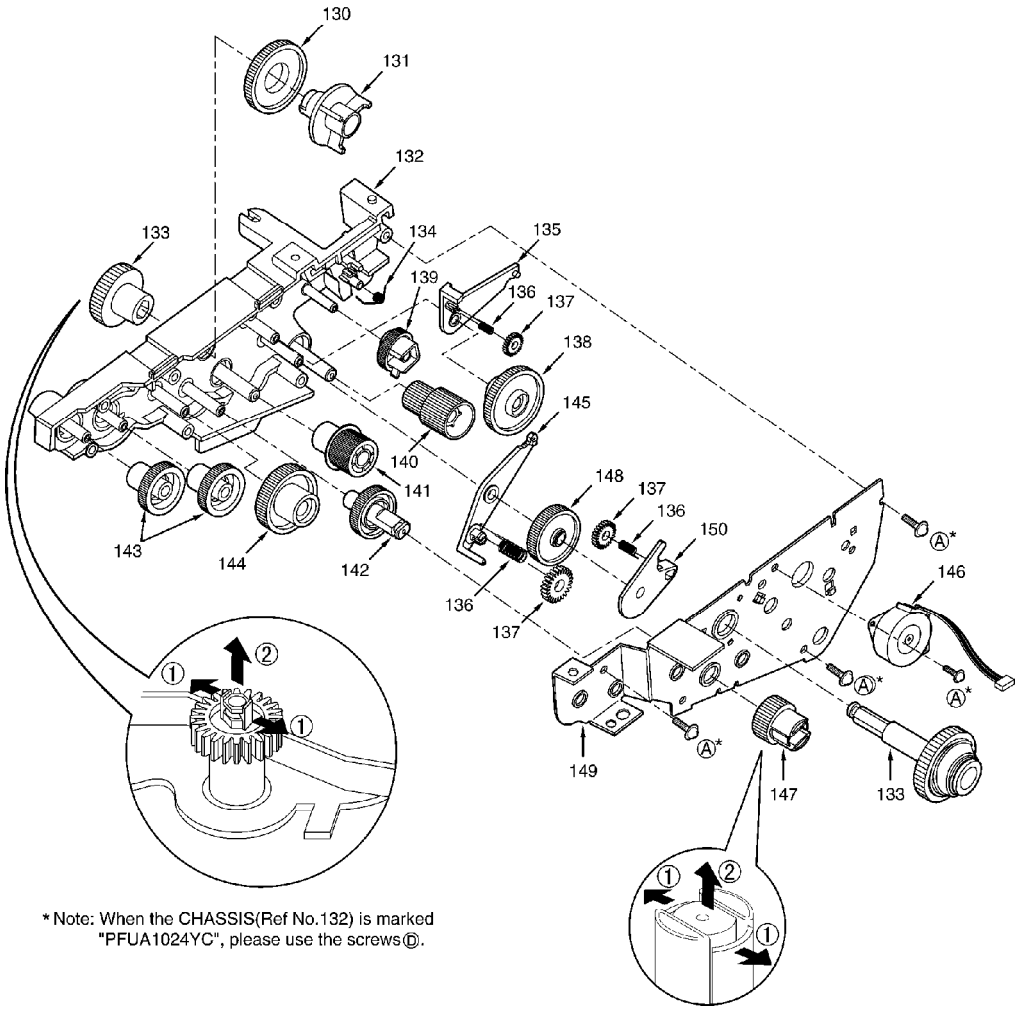


9.3. LOWER/P.C.B. SECTION

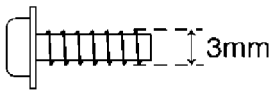
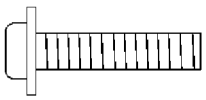
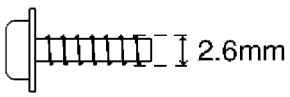
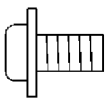


CROSS REFERENCE:
OPERATION PANEL SECTION()

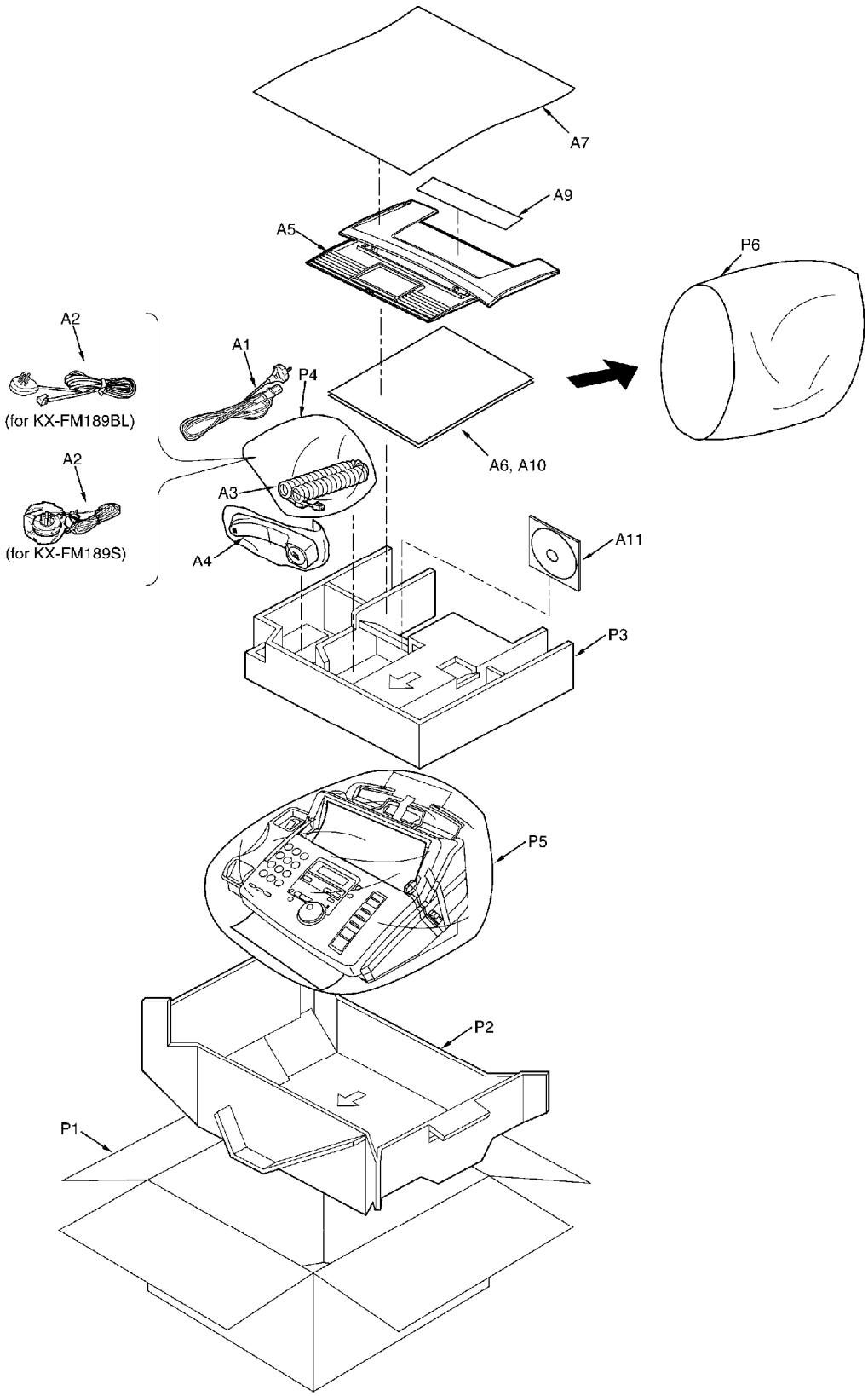
9.4. MOTOR SECTION



9.5. ACTUAL SIZE OF SCREWS AND WASHER

	Part No.	Illustration
Ⓐ	XTW3+S10P	
Ⓑ	XSB4+6	
Ⓒ	XTW3+U14L	
Ⓓ	XTW26+S10P	
Ⓔ	XYC3+CF12FR	
Ⓕ	XTW3+U6LFZ	

10. ACCESSORIES AND PACKING MATERIALS



11. REPLACEMENT PARTS LIST

This replacement parts list is for KX-FM189BL and KX-FM189S only.

Refer to the simplified manual (cover) for other areas.
Notes:

1. **The marking (RTL) indicates that the Retention Time is limited for this item.**
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
   After the end of this period, the assembly will no longer be available.
2. **Important safety notice / Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.**
3. **The S mark indicates service standard parts and may differ from production parts.**
4. **RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor**

Type

ERC:Solid ERD:Carbon PQ4R:Chip	ERX:Metal Film ERG:Metal Oxide ERO:Metal Film	PQRD:Carbon PQRQ:Fuse ERF:Wire Wound

Wattege

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor ECQS:Styrol PQCBX,ECUV:Chip ECMS:Mica	ECCD,ECKD,PQCBC,PQVP : Ceramic ECQM,ECQV,ECQE,ECQU,ECQB : Polyester ECEA,ECSZ,ECOS : Electrolytic ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V 2A : 100V 2E : 250V 2H : 500V	05 : 50V 1 : 100V 2 : 200V	OF : 3.15V 1A : 10V 1V : 35V OJ : 6.3V	OJ : 6.3V 1A : 10V 1C : 16V 1E,25 : 25V	1V : 35V 50,1H : 50V 1J : 63V 2A : 100V

11.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		(12.1.1. OPERATION PANEL SECTION)	
1	PFGP1172J	PANEL, LCD (for KX-FM189BL)	
1	PFGP1172H	PANEL, LCD (for KX-FM189S)	
2	PFBE1005Z1	KNOB, EASY DIAL	
3	PFGG1064Y1	GRILLE, OPERATION PANEL (for KX-FM189BL)	
3	PFGG1064X1	GRILLE, OPERATION PANEL (for KX-FM189S)	
4	PFDN1040Z	ROLLER, DOCUMENT EXIT	
5	PFHG1075Z	SPACER, DOCUMENT SEPARATION	
6	PFDG1148Z	GEAR, DOCUMENT EXIT ROLLER	
7	PFUS1229Z	SPRING, DOCUMENT SEP	
8	PFHR1182Y	ROLLER, DOCUMENT ADJUST	
9	PFUV1027X	COVER, OPERATION PANEL	
10	PFHX1373Z	INSULATOR, SEPATION RUBBER	
11	PFJS11Q70Z	CONNECTOR, 11P	
12	PFBX1096X1	BUTTON, STOP/VOLUME	
13	PFBX1097S1	BUTTON, FUNCTION	
14	PFBX1095Y1	BUTTON, DIALER	
15	PFBC1057Y1	BUTTON, START	
16	PFBC1058Y2	BUTTON, SPEAKER	
17	Not Used		
18	PQJM128Z	MICROPHONE	
19	PFJS02Q78Z	CONNECTOR, 2P	
		(12.1.2. UPPER CABINET SECTION)	
30	PFHX1350Z	SPACER, THERMAL HEAD	
31	PFJS11Q69Z	CONNECTOR, 11P	
32	PFHR1189Y	GUIDE, THERMAL HEAD (LEFT)	
33	PFJHS019Z	PRINTER UNIT, THERMAL HEAD	
34	PFHR1190Y	GUIDE, THERMAL HEAD (RIGHT)	
35	PFHR1192X	COVER, THERMAL HEAD	
36	PFHX1342X	INSULATOR, STATIC ELEC. (RIGHT)	
37	PFQT1666Z	LABEL, BLUE GEAR	
38	PFHX1343Z	INSULATOR, STATIC ELEC.	
39	PFUS1235Z	SPRING, THERMAL HEAD	
40	PFUS1254Z	SPRING, POP UP	
41	PFUS1236Z	SPRING, OPERATION PANEL LOCK	
42	PFUS1233Z	SPRING, CIS	
43	PFJS10Q72Z	CONNECTOR, 10P	
44	PFKM1057W1	CABINET, MAIN	
45	PF0U1022Z	PHOTO ELECTRIC TRANSDUCER, IMAGE SENSOR(CIS)	
46	PFHX1344Z	INSULATOR, STATIC ELEC.	
47	PFPE1075Z	SHEET PAPER, INK RIBBON (10M)	
48	Not Used		
49	Not Used		
50	PFHS1029Z	COVER, BACK TENSION SHEET	
51	PFHX1457Z	SPACER, SHEET	
		(12.1.3. BACK COVER SECTION-1)	
60	PFDE1126Z1	LEVER, CASSETTE	
61	PFGT1787Z-C	NAME PLATE(for KX-FM189BL)	⚠
61	PFGT1788Z-C	NAME PLATE(for KX-FM189S)	

Ref. No.	Part No.	Part Name & Description	Remarks
62	PFQT1675Z	LABEL, FACE DOWN (for KX-FM189BL)	
62	PFQT1678Z	LABEL, FACE DOWN (for KX-FM189S)	
63	PFUS1238Z	SPRING, PICKUP	
64	PFKS1039Z	TRAY, CASSETE	
65	PFKV1027Y1	COVER, UPPER TURN	
66	PFHG1088Z	RUBBER, PAPER SEPARATION	
67	PFHX1339Z	INSULATOR, STATIC	
68	PFUA1025W	CHASSIS, UPPER TURN	
69	PFUS1244Z	SPRING, EARTH	
70	PFHR1220Z	GUIDE, CORNER (LEFT)	
71	PFHR1221Z	GUIDE, CORNER (RIGHT)	
72	PFDN1042Z	ROLLER, PICKUP	
73	PFDG1163Z	GEAR, PICKUP ROLLER	
74	PFKR1017Z1	GUIDE, DOCUMENT (RIGHT)	
75	PFDR1012Z	ROLLER, SUPPORT	
76	PFUS1234Z	SPRING, EXIT. SUB ROLLER	
77	PFKR1016Z1	GUIDE, DOCUMENT (LEFT)	
78	PFDG1161Z	GEAR, DOCUMENT GUIDE	
		(12.1.4. BACK COVER SECTION-2)	
79	PFDJ1030Z	SPACER,PLATEN (RIGHT)	
80	PFDG1165Y	GEAR, PLATE	
81	PFDE1130Y1	LEVER, LOCK	
82	PFUS1258Z	SPRING, LOCK LEVER	
83	PFHS1029Z	COVER, BACK TENSION SHEET	
84	PFDG1160Z	GEAR, BACK TENSION	
85	PFUS1232Z	SPRING, BACK TENSION	
86	PFDG1164Z	GEAR, PICKUP IDLER	
87	PFDG1166Z	GEAR, PLATEN IDLER	
88	PFDN1041Z	ROLLER, EXIT	
89	PFUS1237Z	SPRING, PAPER TOP	
90	PFDG1162Z	GEAR, EXIT ROLLER	
91	PFDE1128Y	LEVER, PAPER TOP SENSOR	
92	PFDJ1029Z	SPACER, PLATEN (LEFT)	
93	PFDN1043Z	ROLLER, PLATEN	
94	PFHX1370Z	INSULATOR, PAPER EXIT	
95	PFUS1250Y	SPRING, RECORDING PAPER SUPPORT	
		(12.1.5. LOWER CABINET , P.C.B. SECTION)	
100	PFMD1044Z	FRAME, BOTTOM	
101	PFHG1050Z	RUBBER, LEG	
102	PFUS1255Y	SPRING, EARTH	
103	PFJP03S04Z	CONNECTOR, 3P	
104	PFJS02R19Y	CONNECTOR, 2P	
105	PQLB1E1	INSULATOR, FERRITE CORE	S
106	PQHR945Z	BAND, LEAD BINDER	
107	PFJS07Q67Z	CONNECTOR, 7P	
108	XWC4B	WASHER	
109	Not Used		

Ref. No.	Part No.	Part Name & Description	Remarks
110	Not Used		
111	PFDE1129Z	LEVER, PAPER TOP SENSOR	
112	PFBH1014Z1	BUTTON, HOOK	
113	Not Used		
114	PFUS1239Z	SPRING, SPEAKER	
115	PFJS02R60Z	CONNECTOR, 2P	
116	PFAS50P003Z	SPEAKER	
117	PFDR1014Z	ROLLER, DOCUMENT SEPARATION	
118	PFDE1133Z	SPACER, DELAY	
119	PFDF1050Z	SHAFT, DOCUMENT SEPARATION	
120	Not Used		
121	Not Used		
122	PFHX1382Z	SPACER	
123	KR06TT251508	INSULATOR, FERRITE CORE	
124	BB17M3M3	LEAD WIRE	
125	PQLB1C1	INSULATOR, FERRITE CORE	
126	Not Used		
127	Not Used		
128	PFQT1671Z	LABEL, AC 120V COVER	
129	PQLB1E1	INSULATOR, FERRITE CORE	
160	PQHR136Z	BINDER	
161	PJHE5065Z	SCREW	
162	PFQT1250Z	LABEL, CAUTION (for KX-FM189BL)	
162	PFQT1382Z	LABEL, S CAUTION (for KX-FM189S)	
163	PFMH1082Z	FRAME, PLATE	
164	PFJS11Q71Z	CONNECTOR, 11P	
165	PFHX1456Z	SPACER,SHEET	
		(12.1.6. MOTOR SECTION)	
130	PFDG1155Z	GEAR, E	
131	PFHR1186Z	SPACER, SUPPORT BASE	
132	PFZMFM189E	CHASSIS KIT, GEAR BASE	
133	PFDX1022Z	GEAR, TORQUE LIMITER ASS'Y	
134	PFUS1230Z	SPRING, CAM	
135	PFHR1184Z	ARM, J	
136	PFUS1231Y	SPRING, GEAR I	
137	PFDG1159Z	GEAR, I	
138	PFDG1149Z	GEAR, A	
139	PFDG1152Z	GEAR, CAM	
140	PFDG1158Z	GEAR, H	
141	PFDG1151Z	GEAR, C	
142	PFDG1153Z	GEAR, D1	
143	PFDG1157Z	GEAR, G	
144	PFDG1156Z	GEAR, F	
145	PFHR1183Z	ARM, I	
146	PFJQ35S1S15D	DC MOTOR	S
147	PFDG1154Z	GEAR, D2	
148	PFDG1150Z	GEAR, B	
149	PFMD1043Z	FRAME, GEAR BASE COVER	
150	PFHR1185Z	ARM, V	

Ref. No.	Part No.	Part Name & Description	Remarks
		(12.1.7. ACCESSORIES AND PACKING MATERIALS)	
A1	PQJA10038Y	POWER CORD	
A2	PFJA04B004Z	CORD, TELEPHONE (for KX-FM189BL)	⚠
A2	PFJA04B006Z	CORD, TELEPHONE (for KX-FM189S)	
A3	PFJA1029Z	CORD, HANDSET	
A4	PFJXE0905Z	HANDSET	
A5	PFKS1043Z1	TRAY, PAPER	
A6	PFQX1526Z	INSTRUCTION BOOK (for KX-FM189BL)	⚠
A6	PFQX1530Z	INSTRUCTION BOOK (for KX-FM189S)	
A7	PFQW1513Z	INSTRUCTION BOOK (QUICK START SHEET)(for KX-FM189BL)	
A7	PFQW1515Z	INSTRUCTION BOOK (QUICK START SHEET)(for KX-FM189S)	
A8	Not Used		
A9	PFQT1696Z	LABEL, RECORDING PAPER SET	
A10	PFQX1527Z	INSTRUCTION BOOK (PANA LINK GUIDE)(for KX-FM189BL)	
A10	PFQX1531Z	INSTRUCTION BOOK (PANA LINK GUIDE)(for KX-FM189S)	
A11	PFJKFM189E	CD-ROM	
P1	PFPK1863Z-C	GIFT BOX(for KX-FM189BL)	
P1	PFPK1860Z-C	GIFT BOX(for KX-FM189S)	
P2	PFPN1232Y	CUSHION, RIGHT	
P3	PFPN1231Z	CUSHION, LEFT	
P4	XZB20X35A04	PROTECTION COVER	
P5	PFPH1030Z	PACKING SHEET	
P6	XZB32X45A04	PROTECTION COVER	

11.2. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FM189BL	DIGITAL BOARD ASS'Y (RTL)	
		(for KX-FM189BL)	
PCB1	PFWP1FM189S	DIGITAL BOARD ASS'Y (RTL)	
		(for KX-FM189S)	
PCB1-1	PFWP2FM189E	DIGITAL BOARD ASS'Y (RTL) [without ROM](for KX-FM189BL)	
PCB1-1	PFWP2FM189S	DIGITAL BOARD ASS'Y (RTL) [without ROM] (for KX-FM189S)	
		Refer to LOWER/P.C.B. SECTION().	
		(ICS)	
IC501	PFVIM66429M1	IC	
IC502	PFWIFM189BL	IC (ROM) (for KX-FM189BL)	
IC502	PFWIFM189S	IC (ROM) (for KX-FM189S)	
IC503	PFVIMS5148EF	IC	
IC504	PFVIM0525LFF	IC	
IC505	PFVIR675813	IC	
IC507	PFVIXCN4202N	IC	
IC508	PFVIT2003APS	IC	
IC512	PFVIKM29W4AT	IC	
IC513	PFVIMM1385EN	IC	
IC514	AN6383SB	IC	
IC520	PFVISN75189A	IC	
IC521	PFVISN75188E	IC	
IC522	PQVIMT3274AE	IC	S
		(TRANSISTORS)	
Q501	2SB1322	TRANSISTOR(SI)	S
Q502	PQVTDTC114EU	TRANSISTOR(SI)	
Q503	PQVTDTC114EU	TRANSISTOR(SI)	
Q504	2SD1994A	TRANSISTOR(SI)	
Q505	2SD874A	TRANSISTOR(SI)	
Q506	2SD874A	TRANSISTOR(SI)	
Q507	2SC4155S	TRANSISTOR(SI)	
Q508	2SC4155S	TRANSISTOR(SI)	
Q511	2SB709A	TRANSISTOR(SI)	
Q512	PQVTDTC143E	TRANSISTOR(SI)	
Q513	2SC4155S	TRANSISTOR(SI)	
IC506	PFVTSI4431DY	TRANSISTOR(SI)	
		(DIODES)	
D501	PFVDRMRLS245	DIODE(SI)	
D502	MA7160	DIODE(SI)	
D504	RLS71	DIODE(SI)	
D505	RLS71	DIODE(SI)	
D506	RLS71	DIODE(SI)	
D507	RLS71	DIODE(SI)	
D508	PFVDRMRLS245	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
DA502	MA143	DIODE(SI)	
		(BATTERY)	
BAT501	PFSU1004Z	BATTERY	
		(COILS)	
L501	PQLQR1RM601	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L502	PQLQR1RM601	COIL	
L503	PQLQR1RM601	COIL	
L504	PQLQR1RM601	COIL	
L505	PQLQR1RM601	COIL	
L506	PQLQR1RM601	COIL	
L507	PQLQR1RM601	COIL	
L513	PQLQR1ET	COIL	
L514	PQLQR2KA20T	COIL	
L516	PQLQR2KA113T	COIL	
L517	PQLQR1ET	COIL	
L518	PQLQR2KA20T	COIL	
L519	PQLQR2KA20T	COIL	
L520	PQLQR2KA113T	COIL	
L522	PQLQR2KA20T	COIL	
L523	PQLQR2KA20T	COIL	
L525	PQLQR2KA113T	COIL	
L527	PQLQR2KA20T	COIL	
LFT104	ELB3S402E	COIL	
R637	PQLQR2KB113T	COIL	
		(CERAMIC FILTER)	
X504	PQVBT4.19G2	CERAMIC FILTER	
		(COMPONENTS COMBINATIONS)	
RA501	EXB38V101JV	COMPONENTS PARTS	
RA502	EXB38V101JV	COMPONENTS PARTS	
RA503	EXB38V101JV	COMPONENTS PARTS	
RA504	EXB38V101JV	COMPONENTS PARTS	
RA505	EXB38V101JV	COMPONENTS PARTS	
RA506	EXB38V101JV	COMPONENTS PARTS	
		(CONNECTORS)	
CN501	PQJP17A19Z	CONNECTOR, 17PIN	
CN502	PQJP5G30Z	CONNECTOR, 5PIN	
CN503	PQJP10G30Z	CONNECTOR, 10PIN	
CN504	PQJP11G30Z	CONNECTOR, 11PIN	
CN505	PQJP11G100Z	CONNECTOR, 11PIN	
CN506	PQJP7G30Z	CONNECTOR, 7PIN	
CN507	PQJP10A19Z	CONNECTOR, 10PIN	
CN508	PFJP11A12Z	CONNECTOR, 11PIN	
CN509	PQJP3G30Z	CONNECTOR, 3PIN	
		(SWITCH)	
SW501	PFSH1A001Z	SWITCH, FILM & COVER DETECTION	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PQVCJ2400N5Z	CRYSTAL OSCILLATOR	
X503	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(FUSES)	
F501	PFRB001251KC	FUSE	
F502	PFRB002122KZ	FUSE	

Ref. No.	Part No.	Part Name & Description	Remarks
		(PHOTO ELECTRIC TRANSDUCER)	
PS501	PFVISG257	PHOTO ELECTRIC TRANSDUCER	
		(RESISTORS)	
J600	ERJ8GEY0R00	0	
L508	ERJ3GEYJ101	100	
L509	ERJ3GEYJ101	100	
L510	ERJ3GEYJ101	100	
L511	ERJ3GEYJ101	100	
L512	ERJ3GEYJ101	100	
L515	PQ4R18XJ100	10	
L521	ERJ8GEY0R00	0	
L524	PQ4R18XJ220	22	
L526	ERJ3GEY0R00	0	
L528	ERJ3GEY0R00	0	
R501	ERJ3GEY0R00	0	
R502	ERJ3GEY0R00	0	
R503	ERJ3GEY0R00	0	
R504	PQ4R10XJ102	1k	S
R505	ERJ3GEYJ562	5.6k	
R506	ERJ3GEYJ472	4.7k	
R507	ERJ3GEY0R00	0	
R508	ERJ3GEY0R00	0	
R509	ERJ3GEYJ271	270	
R510	ERJ3GEY0R00	0	
R511	ERJ3GEY0R00	0	
R512	ERJ3GEYJ821	820	
R513	ERDS1VJ152	1.5k	
R514	ERJ3GEYJ223	22k	
R515	ERJ3GEYJ823	82k	
R516	PQ4R10XJ220	22	S
R517	ERJ3GEYJ101	100	
R518	ERJ3GEYJ682	6.8k	
R519	ERJ3GEYJ822	8.2k	
R520	ERJ3GEYJ103	10k	
R521	PQ4R10XJ4R7	4.7	S
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ682	6.8k	
R524	ERJ3GEYJ153	15k	
R525	PQ4R10XJ150	15	S
R526	ERJ3GEY0R00	0	
R527	ERJ3GEYJ103	10k	
R528	ERJ3GEYJ392	3.9k	
R529	ERJ3GEYJ203	20k	
R530	ERJ3GEYJ392	3.9k	
R531	ERJ3GEY0R00	0	
R533	ERJ3GEYJ102	1k	
R534	ERJ3GEYJ471	470	
R535	ERJ3GEYJ101	100	
R536	ERJ3GEYJ101	100	
R537	ERJ3GEYJ101	100	
R538	ERJ3GEYJ101	100	
R539	ERJ3GEYJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R540	ERJ3GEYJ102	1k	
R541	ERJ3GEYJ473	47k	
R542	ERJ3GEYJ473	47k	
R543	ERJ3GEYJ222	2.2k	
R544	ERJ3GEYJ222	2.2k	
R546	ERJ3GEYJ472	4.7k	
R547	ERJ3EKF1101	1.1k	
R548	ERJ3EKF4701	4.7k	
R549	ERJ3GEYJ104	100k	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ102	1k	
R552	ERJ3GEYJ101	100	
R553	ERJ3GEY0R00	0	
R554	ERJ3GEYJ101	100	
R555	ERJ3GEYJ105	1M	
R556	ERJ3GEYJ103	10k	
R557	ERJ3GEYJ103	10k	
R558	PQ4R18XJ8R2	8.2	
R559	ERJ3GEYJ103	10k	
R560	ERJ3GEYJ101	100	
R561	ERJ3GEYJ103	10k	
R562	ERJ3GEYJ472	4.7k	
R563	ERJ3GEY0R00	0	
R564	ERJ3GEYJ474	470k	
R565	ERJ3GEYJ101	100	
R566	ERJ3GEYJ101	100	
R568	ERJ3GEYJ101	100	
R570	ERJ3GEYJ104	100k	
R572	ERJ3GEYJ823	82k	
R573	ERJ3GEYJ103	10k	
R574	ERJ3GEYJ183	18k	
R575	ERJ3GEYJ823	82k	
R576	ERJ3GEYJ822	8.2k	
R578	ERJ3GEYJ183	18k	
R579	ERJ3GEYJ683	68k	
R580	ERJ3GEYJ823	82k	
R581	ERJ3GEYJ822	8.2k	
R582	ERJ3GEYJ4R7	4.7	
R584	ERJ3GEYJ103	10k	
R587	ERJ3GEYJ103	10k	
R591	ERJ3GEYJ222	2.2k	
R592	ERJ3GEYJ102	1k	
R593	ERJ3GEY0R00	0	
R594	ERJ3GEYJ103	10k	
R595	ERJ3GEYJ331	330	
R596	ERJ3GEYJ105	1M	
R598	ERJ3GEY0R00	0	
R599	ERJ3GEYJ563	56k	
R600	ERJ3GEYJ102	1k	
R601	ERJ3GEYJ222	2.2k	
R602	ERJ3GEYJ562	5.6k	
R603	ERJ3GEY0R00	0	
R604	ERJ3GEYJ272	2.7k	
R605	ERJ3GEYJ123	12k	

Ref. No.	Part No.	Part Name & Description	Remarks
R606	ERJ3GEYJ101	100	
R607	ERJ3GEYJ472	4.7k	
R609	ERJ3GEYJ103	10k	
R610	ERJ3GEYJ103	10k	
R611	ERJ3GEYJ102	1k	
R612	ERJ3GEYJ273	27k	
R616	ERJ3GEYJ103	10k	
R617	ERJ3GEYJ104	100k	
R620	ERJ3GEY0R00	0	
R621	ERJ3GEYJ224	220k	
R622	ERJ3GEYJ224	220k	
R624	ERJ3GEYJ103	10k	
R626	ERJ1WYJ391	390	
R628	ERJ3GEYJ102	1k	
R631	ERJ8GEY0R00	0	
R632	PQ4R10XJ000	0	
R633	ERJ3GEYJ122	1.2k	
R638	ERJ3GEY0R00	0	
R639	ERJ3GEY0R00	0	
R640	ERJ3GEY0R00	0	
		(CAPACITORS)	
C502	PQCUV1H473MD	0.047	S
C508	ECUV1H104ZFV	0.1	S
C509	ECEA1CK101	100	S
C510	ECUV1H561JCV	560P	
C511	ECUV1H104ZFV	0.1	S
C512	ECUV1H104ZFV	0.1	S
C513	ECUV1H104ZFV	0.1	S
C514	ECEA1VKA330	33	
C515	ECUV1H102KBV	0.001	
C516	ECEA1VKA330	33	
C517	ECUV1H104ZFV	0.1	S
C518	ECUV1H104ZFV	0.1	S
C519	ECUV1H104ZFV	0.1	S
C520	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1H104ZFV	0.1	S
C524	ECEA1VKA100	10	
C525	ECUV1H104ZFV	0.1	S
C527	ECUV1H222KBV	0.0022	
C528	ECUV1C104KBV	0.1	
C529	ECUV1C104KBV	0.1	
C531	ECUV1H120JCV	12P	
C532	ECUV1H104ZFV	0.1	S
C533	ECUV1H104ZFV	0.1	S
C534	ECUV1H180JCV	18P	
C535	ECUV1H104ZFV	0.1	S
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H104ZFV	0.1	S
C539	ECUV1H104ZFV	0.1	S
C540	ECUV1H104ZFV	0.1	S
C541	ECUV1H102KBV	0.001	

Ref. No.	Part No.	Part Name & Description	Remarks
C542	ECUV1H102KBV	0.001	
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S
C546	ECUV1H104ZFV	0.1	S
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C549	ECUV1H104ZFV	0.1	S
C550	ECUV1H104ZFV	0.1	S
C551	ERJ3GEY0R00	0	
C552	ECUV1H150JCV	15P	
C554	ECUV1H150JCV	15P	
C555	ECEA1CKS100	10	S
C556	ECUV1H104ZFV	0.1	S
C557	ECUV1C104KBV	0.1	
C558	ECUV1H104ZFV	0.1	S
C559	ECUV1H120JCV	12P	
C560	ECUV1H103KBV	0.01	
C561	ECUV1H100DCV	10P	S
C562	ECUV1H472KBV	0.0047	
C563	ECUV1H472KBV	0.0047	
C564	ECUV1H104ZFV	0.1	S
C565	PQCUV1C224ZF	0.22	
C566	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1H330JCV	33P	
C569	ECEA0JK221	220	S
C570	ECUV1C104KBV	0.1	
C571	ECUV1H681KBV	680P	
C572	ECUV1H681KBV	680P	
C573	ECUV1H681KBV	680P	
C574	PQCUV1C224ZF	0.22	
C575	ECUV1H104ZFV	0.1	S
C576	ECEA0JK221	220	S
C577	ECUV1H680JCV	68P	
C580	ECEA1CKS100	10	S
C581	ECUV1H181JCV	180P	
C582	ECUV1H820JCV	82P	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1C104KBV	0.1	
C586	PQCUV1E104MD	0.1	S
C587	ECUV1C473KBV	0.047	
C588	ECUV1H104ZFV	0.1	S
C589	ECUV1H104ZFV	0.1	S
C590	ECUV1H561JCV	560P	S
C591	ECUV1H121JCV	120P	
C593	ECUV1H104ZFV	0.1	S
C596	ECEA0JK221	220	S
C601	ECUV1C104KBV	0.1	
C602	ECEA1CKS100	10	S
C603	ECUV1H104ZFV	0.1	S
C604	ECUV1H104ZFV	0.1	S
C605	ECEA1CKS100	10	S
C606	ECEA1CKS100	10	S
C607	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C608	ECUV1H104ZFV	0.1	S
C609	ECEA1CKS100	10	S
C610	ECUV1H104ZFV	0.1	S
C611	ECUV1C104KBV	0.1	
C612	ECUV1H102KBV	0.001	
C613	ECUV1H101JCV	100P	
C614	ECUV1H104ZFV	0.1	S
C615	ECUV1C393KBV	0.039	
C616	ECUV1C104KBV	0.1	
C617	ECUV1H102KBV	0.001	
C618	ECEA1CKS100	10	S
C619	ECEA1CKS100	10	S
C620	ECUV1H104ZFV	0.1	S
C621	ECUV1H104ZFV	0.1	S
C622	ECUV1H103KBV	0.01	
C626	ECUV1H102KBV	0.001	
C627	ECUV1C104KBV	0.1	
C628	ECUV1H333KDV	0.033	S
C630	ECUV1H183KBV	0.018	
C631	ECUV1C104KBV	0.1	
C632	ECUV1H104ZFV	0.1	S
C633	ECUV1C104KBV	0.1	
C634	ECUV1H104ZFV	0.1	S
C635	PQCUV1H104ZF	0.1	

11.3. ANALOG BOARD PARTS

11.3.1. for KX-FM189BL

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFWP3FP185E	ANALOG BOARD ASS'Y (RTL)	⚠
		Refer to LOWER/P.C.B. SECTION().	
		(ICS)	
IC101	PQVINJM082BM	IC	
IC102	PQVINJM2113M	IC	
IC106	PQVINJM082BM	IC	
IC107	AN6183SE1	IC	S
		(TRANSISTORS)	
Q105	2SC2235	TRANSISTOR(SI)	
Q108	PQVTDTC143E	TRANSISTOR(SI)	
Q109	2SC4155S	TRANSISTOR(SI)	
Q110	2SC4155S	TRANSISTOR(SI)	
Q111	2SC4155S	TRANSISTOR(SI)	
Q112	2SA1627	TRANSISTOR(SI)	
Q114	2SB1218A	TRANSISTOR(SI)	
Q115	PQVTDTC143E	TRANSISTOR(SI)	
Q117	2SC4155R	TRANSISTOR(SI)	
Q124	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	

Ref. No.	Part No.	Part Name & Description	Remarks
D102	MA4056	DIODE(SI)	
D107	MA4056	DIODE(SI)	
D108	MA4056	DIODE(SI)	
D109	1SS119	DIODE(SI)	
D111	PQVDHZS2B1	DIODE(SI)	
D114	1SS119	DIODE(SI)	
D115	MA700A	DIODE(SI)	
D116	1SS119	DIODE(SI)	
D117	1SS119	DIODE(SI)	
D118	PFVDDGS1ZB60	DIODE(SI)	
D121	MA4056	DIODE(SI)	
D122	MA4056	DIODE(SI)	
D125	1SS119	DIODE(SI)	
D126	1SS119	DIODE(SI)	
		(COILS)	
L108	PQLQR2KB113T	COIL	
L109	PQLQR2KB113T	COIL	
L110	PQLQR2KB113T	COIL	
L111	PQLQR2KB113T	COIL	
L116	PQLQR2KB113T	COIL	
L124	PQLQR2KB113T	COIL	
L126	PQLQR2KB20T	COIL	
L127	PQLQR2KB20T	COIL	
L128	PQLQR2KB20T	COIL	
L129	PQLQR2KB20T	COIL	
L130	PQLQR2KB113T	COIL	
JJ262	PQLQR2KB20T	COIL	
FLT101	PFLE003	COIL	
FLT103	PFLE126	COIL	
FLT105	PFLQZ004	COIL	
FLT106	PFLQZ004	COIL	
R108	PQLQR2KB113T	COIL	
R187	PQLQR2KA113T	COIL	
R195	PQLQR2KB113T	COIL	
		(CONNECTORS)	
CN101	PQJS17A10Z	CONNECTOR, 17PIN	
CN105	PQJP02G100Z	CONNECTOR, 2PIN	
CN106	PQJS10A10Z	CONNECTOR, 10PIN	
		(JACKS)	
CN102	PQJJ1TC5Z	JACK	S
CN104	PQJJ1TB18Z	JACK	
		(COMPONENT PARTS)	
L107	EXCELDR35	COMPONENTS PARTS	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC102	PQVITLP620K	PHOTO ELECTRIC TRANSDUCER	⚠
PC104	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC106	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC107	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
		(SWITCHES)	
SW101	ESE14A211	SWITCH	
SW102	PFSH1A002Z	SWITCH	
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR	
SA102	PFRZ003Z	VARISTOR	⚠
ZNR101	ERZVA7D151	VARISTOR	
		(CERAMIC FILTERS)	
L103	PFVF2A102ST	CERAMIC FILTER	
L104	PFVF2A102ST	CERAMIC FILTER	
L105	PFVF2A102ST	CERAMIC FILTER	
L106	PFVF2A102ST	CERAMIC FILTER	
L125	PFVF2B272ST	CERAMIC FILTER	
		(FUSE)	
F101	PQBA1N10NMAL	FUSE	
		(RELAY)	
RL101	PFSL003Z	RELAY	⚠
		(TRANSFORMERS)	
T101	PFLT8E003	TRANSFORMER	⚠
T102	PFLT8E004	TRANSFORMER	⚠
		(RESISTORS)	
C121	ERJ3GEYJ753	75k	
C122	ERJ3GEYJ753	75k	
C190	ERJ6GEY0R00	0	
J124	ERJ3GEY0R00	0	
J155	ERJ6GEY0R00	0	
JJ221	ERDS1TJ331	330	
L117	ERJ3GEY0R00	0	
L118	ERJ3GEY0R00	0	
L119	ERJ3GEY0R00	0	
L120	ERJ3GEY0R00	0	
L121	ERJ3GEY0R00	0	
L122	ERJ3GEY0R00	0	
L123	ERJ3GEY0R00	0	
R112	ERJ3GEYJ433	43k	
R113	ERJ3GEYJ184	180k	
R114	ERJ3GEYJ184	180k	
R118	ERJ3GEY0R00	0	
R122	ERJ3GEYJ304	300k	
R125	ERJ3GEYJ561	560	
R128	ERJ3GEYJ331	330	
R131	ERJ3GEYJ101	100	
R134	ERJ3GEYJ332	3.3k	
R135	ERJ3GEYJ472	4.7k	
R136	ERJ3GEYJ182	1.8k	

Ref. No.	Part No.	Part Name & Description	Remarks
R137	ERJ3GEYJ102	1k	
R138	ERJ3GEYJ332	3.3k	
R141	ERJ3GEYJ101	100	
R142	ERJ3GEYJ472	4.7k	
R143	ERJ3GEYJ103	10k	
R144	ERJ3GEYJ103	10k	
R146	ERDS1VJ000	0	
R151	ERJ3GEYJ222	2.2k	
R153	ERJ3GEYJ222	2.2k	
R155	ERDS2TJ121	120	
R156	ERJ3GEYJ123	12k	
R158	ERDS2TJ391	390	
R159	ERJ3GEYJ103	10k	
R164	ERJ3GEYJ153	15k	
R166	ERJ3GEYJ102	1k	
R168	ERJ3GEYJ101	100	
R169	ERJ3GEYJ103	10k	
R171	ERJ3GEYJ561	560	
R173	ERDS2TJ120	12	
R174	ERJ3GEYJ473	47k	
R175	ERJ3GEYJ154	150k	
R176	ERJ3GEYJ114	110k	
R177	ERJ3GEYJ822	8.2k	
R178	ERG2SJ821	820	
R179	ERJ3GEYJ474	470k	
R180	ERJ3GEYJ105	1M	
R181	ERJ3GEYJ204	200k	
R183	ERJ3GEYJ333	33k	
R184	ERJ3GEYJ684	680k	
R185	PQ4R10XJ562	5.6k	S
R186	ERJ3GEYJ124	120k	
R193	ERJ3GEYJ123	12k	
R194	ERJ3GEYJ474	470k	
R196	ERJ3GEYJ103	10k	
R198	ERJ3GEYJ333	33k	
R201	ERJ3GEYJ224	220k	
R202	ERDS1TJ223	22k	
R203	ERJ3GEYJ623	62k	
R204	ERJ3GEYJ243	24k	
R205	ERJ3GEYJ224	220k	
R206	ERJ3GEYJ223	22k	
R207	ERJ3GEYJ243	24k	
R208	ERJ3GEYJ473	47k	
R209	ERJ3GEYJ101	100	
R210	ERJ3GEYJ331	330	
R212	ERJ3GEYJ331	330	
R213	ERJ3GEYJ182	1.8k	
R214	ERJ3GEYJ182	1.8k	
R215	ERDS1TJ183	18k	
R216	ERJ3GEYJ123	12k	
R223	ERJ3GEY0R00	0	
R230	ERJ3GEYJ103	10k	
R234	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
		(CAPACITORS)	
C110	ECUV1C104KBV	0.1	
C113	ECUV1E225ZF	2.2	
C116	ECUV1H220JCV	22P	
C117	PQCUV1H104ZF	0.1	
C119	ECUV1H220JCV	22P	
C126	ECUV1H331JCV	330P	
C129	ECUV1H153KBV	0.015	
C130	ECUV1H153KBV	0.015	
C133	PQCUV1C224KB	0.22	
C135	ECUV1H103KBV	0.01	
C136	ECEA1HKS4R7	4.7	
C138	PQCUV1C334KB	0.33	
C139	ECEA0JKS101	100	
C141	PQCUV1E104MD	0.1	S
C142	PQCUV1C334KB	0.33	
C143	PQCUV1H563KB	0.056	
C144	ECUV1H104ZFV	0.1	S
C145	ECEA0JKS101	100	
C146	ECUV1H103KBV	0.01	
C147	ECUV1H104ZFV	0.1	S
C148	ECUV1C273KBV	0.027	
C149	PQCUV1H104ZF	0.1	
C150	ECEA1CK101	100	
C153	ECEA1HKS2R2	2.2	
C155	PQCUV1H104ZF	0.1	
C159	ECEA1CKS470	47	
C161	ECUV1H183KBV	0.018	
C162	ECUV1E333KBV	0.033	
C165	ECEA1HKS4R7	4.7	
C166	ECEA1HKS010	1	
C167	ECUV1H102KBV	0.001	
C169	ECUV1H104ZFV	0.1	S
C170	ECEA1HKS4R7	4.7	
C173	ECEA1HKS220	22	
C174	PFCA1HYK101M	100P	
C176	ECUV1C104KBV	0.1	
C177	PQCUV1H332KB	0.0033	
C179	ECKD2H681KB	680P	S
C180	ECKD2H681KB	680P	S
C181	PQCUV1C224ZF	0.22	
C182	ECEA0JU331	330	
C183	ECUV1C104KBV	0.1	
C184	ECUV1H103KBV	0.01	
C185	ECUV1C563KBV	0.056	
C191	PQCUV1H104ZF	0.1	
C193	ECUV1H121JCV	120P	
C194	ECUV1H471JCV	470P	
C195	ECUV1H121JCV	120P	
C197	ECUV1C104KBV	0.1	
C198	ECQE2E105KZ	1	S
C199	ECUV1C473KBV	0.047	
C200	ECUV1C473KBV	0.047	
C202	ECEA1CKS100	10	

Ref. No.	Part No.	Part Name & Description	Remarks
C205	ECUV1H103KBV	0.01	
C207	ECEA1CKS470	47	S
C210	ECUV1H103KBV	0.01	
C212	ECUV1C475ZF	4.7	
C214	ECUV1H103KBV	0.01	
C220	ECUV1H100DCV	10P	S
C222	PQCUV1H104ZF	0.1	
C223	ECEA1HKS100	10	
C224	ECUV1H681JCV	680P	
C226	ECUV1H100DCV	10P	S
C228	ECUV1H104ZFV	0.1	S
C229	ECUV1H104ZFV	0.1	S

11.3.2. for KX-FM189S

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFWP3FM189NW	ANALOG BOARD ASS'Y (RTL)	⚠
		Refer to LOWER/P.C.B. SECTION().	
		(ICS)	
IC101	PQVINJM082BM	IC	
IC102	PQVINJM2113M	IC	
IC106	PQVINJM082BM	IC	
IC107	AN6183SE1	IC	S
		(TRANSISTORS)	
Q105	2SC2235	TRANSISTOR(SI)	
Q108	PQVTDTC143E	TRANSISTOR(SI)	
Q109	2SC4155S	TRANSISTOR(SI)	
Q110	2SC4155S	TRANSISTOR(SI)	
Q111	2SC4155S	TRANSISTOR(SI)	
Q112	2SA1627	TRANSISTOR(SI)	
Q114	2SB1218A	TRANSISTOR(SI)	
Q115	PQVTDTC143E	TRANSISTOR(SI)	
Q116	2SA1627	TRANSISTOR(SI)	
Q117	2SC4155R	TRANSISTOR(SI)	
Q124	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	
D102	MA4056	DIODE(SI)	
D107	MA4056	DIODE(SI)	
D108	MA4056	DIODE(SI)	
D109	1SS119	DIODE(SI)	
D111	PQVDHZS2B1	DIODE(SI)	
D114	1SS119	DIODE(SI)	
D115	MA700A	DIODE(SI)	
D116	1SS119	DIODE(SI)	
D117	1SS119	DIODE(SI)	
D118	PFVDDGS1ZB60	DIODE(SI)	
D121	MA4056	DIODE(SI)	
D122	MA4056	DIODE(SI)	
D125	1SS119	DIODE(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
D126	1SS119	DIODE(SI)	
		(COILS)	
L108	PQLQR2KB113T	COIL	
L109	PQLQR2KB113T	COIL	
L110	PQLQR2KB113T	COIL	
L111	PQLQR2KB113T	COIL	
L116	PQLQR2KB113T	COIL	
L124	PQLQR2KB113T	COIL	
L126	PQLQR2KB20T	COIL	
L127	PQLQR2KB20T	COIL	
L128	PQLQR2KB20T	COIL	
L129	PQLQR2KB20T	COIL	
L130	PQLQR2KB113T	COIL	
JJ262	PQLQR2KB20T	COIL	
FLT101	PFLE003	COIL	
FLT103	PFLE126	COIL	
FLT105	PFLQZ004	COIL	
FLT106	PFLQZ004	COIL	
R108	PQLQR2KB113T	COIL	
R187	PQLQR2KA113T	COIL	
R195	PQLQR2KB113T	COIL	
		(CONNECTORS)	
CN101	PQJS17A10Z	CONNECTOR, 17PIN	
CN105	PQJP02G100Z	CONNECTOR, 2PIN	
CN106	PQJS10A10Z	CONNECTOR, 10PIN	
		(JACKS)	
CN102	PQJJ1TC5Z	JACK	S
CN104	PQJJ1TB18Z	JACK	
		(COMPONENT PARTS)	
L107	EXCELDR35	COMPONENTS PARTS	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC102	PQVITLP620K	PHOTO ELECTRIC TRANSDUCER	⚠
PC104	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC105	PQVIPS2532-1	PHOTO ELECTRIC TRANSDUCER	⚠
PC106	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC107	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
		(SWITCHES)	
SW101	ESE14A211	SWITCH	
SW102	PFSH1A002Z	SWITCH	
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR	
SA102	PFRZ003Z	VARISTOR	⚠
ZNR101	ERZVA7D151	VARISTOR	
		(CERAMIC FILTERS)	

Ref. No.	Part No.	Part Name & Description	Remarks
L103	PFVF2A102ST	CERAMIC FILTER	
L104	PFVF2A102ST	CERAMIC FILTER	
L105	PFVF2A102ST	CERAMIC FILTER	
L106	PFVF2A102ST	CERAMIC FILTER	
L125	PFVF2B272ST	CERAMIC FILTER	
		(FUSE)	
F101	PQBA1N10NMAL	FUSE	
		(RELAY)	
RL101	ATXD20328	RELAY	⚠
		(TRANSFORMERS)	
T101	PFLT8E003	TRANSFORMER	⚠
T102	PFLT8E004	TRANSFORMER	⚠
		(RESISTORS)	
C121	ERJ3GEYJ823	82k	
C122	ERJ3GEYJ823	82k	
C190	ERJ6GEY0R00	0	
J124	ERJ3GEY0R00	0	
J155	ERJ6GEY0R00	0	
JJ221	ERDS1TJ331	330	
L117	ERJ3GEY0R00	0	
L118	ERJ3GEY0R00	0	
L119	ERJ3GEY0R00	0	
L120	ERJ3GEY0R00	0	
L121	ERJ3GEY0R00	0	
L122	ERJ3GEY0R00	0	
L123	ERJ3GEY0R00	0	
R112	ERJ3GEYJ433	43k	
R113	ERJ3GEYJ184	180k	
R114	ERJ3GEYJ184	180k	
R118	ERJ3GEY0R00	0	
R122	ERJ3GEYJ474	470k	
R125	ERJ3GEYJ561	560	
R128	ERJ3GEYJ331	330	
R131	ERJ3GEYJ101	100	
R134	ERJ3GEYJ332	3.3k	
R135	ERJ3GEYJ472	4.7k	
R136	ERJ3GEYJ182	1.8k	
R137	ERJ3GEYJ182	1.8k	
R138	ERJ3GEYJ332	3.3k	
R141	ERJ3GEYJ101	100	
R142	ERJ3GEYJ472	4.7k	
R143	ERJ3GEYJ103	10k	
R144	ERJ3GEYJ103	10k	
R146	ERDS1VJ000	0	
R151	ERJ3GEYJ222	2.2k	
R153	ERJ3GEYJ222	2.2k	
R155	ERDS2TJ121	120	
R156	ERJ3GEYJ123	12k	

Ref. No.	Part No.	Part Name & Description	Remarks
R158	ERDS2TJ391	390	
R159	ERJ3GEYJ103	10k	
R164	ERJ3GEYJ153	15k	
R166	ERJ3GEYJ102	1k	
R168	ERJ3GEYJ101	100	
R169	ERJ3GEYJ103	10k	
R171	ERJ3GEYJ561	560	
R173	ERDS2TJ120	12	
R174	ERJ3GEYJ473	47k	
R175	ERJ3GEYJ154	150k	
R176	ERJ3GEYJ114	110k	
R177	ERJ3GEYJ822	8.2k	
R178	ERG2SJ821	820	
R179	ERJ3GEYJ474	470k	
R180	ERJ3GEYJ105	1M	
R181	ERJ3GEYJ204	200k	
R183	ERJ3GEYJ333	33k	
R184	ERJ3GEYJ684	680k	
R185	PQ4R10XJ562	5.6k	S
R186	ERJ3GEYJ124	120k	
R189	ERDS2TJ472	4.7k	
R191	ERJ3GEYJ102	1k	
R192	ERJ3GEYJ104	100k	
R193	ERJ3GEYJ123	12k	
R194	ERJ3GEYJ474	470k	
R196	ERJ3GEYJ103	10k	
R198	ERJ3GEYJ333	33k	
R201	ERJ3GEYJ224	220k	
R202	ERDS1TJ223	22k	
R203	ERJ3GEYJ623	62k	
R204	ERJ3GEYJ243	24k	
R205	ERJ3GEYJ224	220k	
R206	ERJ3GEYJ223	22k	
R207	ERJ3GEYJ243	24k	
R208	ERJ3GEYJ473	47k	
R209	ERJ3GEYJ101	100	
R210	ERJ3GEYJ331	330	
R212	ERJ3GEYJ331	330	
R213	ERJ3GEYJ182	1.8k	
R214	ERJ3GEYJ182	1.8k	
R215	ERDS1TJ183	18k	
R216	ERJ3GEYJ123	12k	
R223	ERJ3GEY0R00	0	
R230	ERJ3GEYJ103	10k	
R232	ERDS1TJ561	560	
R233	ERJ3GEYJ103	10k	
		(CAPACITORS)	
C110	ECUV1C104KBV	0.1	
C113	ECUV1E225ZF	2.2	
C116	ECUV1H121JCV	120P	
C117	PQCUV1H104ZF	0.1	
C119	ECUV1H121JCV	120P	
C126	ECUV1H221JCV	220P	

Ref. No.	Part No.	Part Name & Description	Remarks
C129	ECUV1H183KBV	0.018	
C130	ECUV1H183KBV	0.018	
C133	PQCUV1C224KB	0.22	
C135	ECUV1H103KBV	0.01	
C136	ECEA1HKS4R7	4.7	
C138	PQCUV1C334KB	0.33	
C139	ECEA0JKS101	100	
C141	PQCUV1H563JC	0.056	S
C142	PQCUV1C334KB	0.33	
C143	PQCUV1H563KB	0.056	
C144	ECUV1H104ZFV	0.1	S
C145	ECEA0JKS101	100	
C146	ECUV1H103KBV	0.01	
C147	ECUV1H104ZFV	0.1	S
C148	ECUV1C273KBV	0.027	
C149	PQCUV1H104ZF	0.1	
C150	ECEA1CK101	100	
C153	ECEA1HKS2R2	2.2	
C155	PQCUV1H104ZF	0.1	
C159	ECEA1CKS470	47	
C161	ECUV1H183KBV	0.018	
C162	ECUV1E333KBV	0.033	
C165	ECEA1HKS4R7	4.7	
C166	ECEA1HKS010	1	
C167	ECUV1H102KBV	0.001	
C169	ECUV1H104ZFV	0.1	S
C170	ECEA1HKS4R7	4.7	
C173	ECEA1HKS220	22	
C174	PFCA1HYK101M	100P	
C176	ECUV1C104KBV	0.1	
C177	PQCUV1H332KB	0.0033	
C179	ECKD2H681KB	680P	S
C180	ECKD2H681KB	680P	S
C181	PQCUV1C224ZF	0.22	
C182	ECEA0JU331	330	
C183	ECUV1C104KBV	0.1	
C184	ECUV1H103KBV	0.01	
C185	ECUV1C563KBV	0.056	
C191	PQCUV1H104ZF	0.1	
C193	ECUV1H121JCV	120P	
C194	ECUV1H471JCV	470P	
C195	ECUV1H121JCV	120P	
C197	ECUV1C104KBV	0.1	
C198	ECQE2E105KZ	1	S
C199	ECUV1C473KBV	0.047	
C200	ECUV1C473KBV	0.047	
C202	ECEA1CKS100	10	
C205	ECUV1H103KBV	0.01	
C207	ECEA1CKS470	47	S
C210	ECUV1H103KBV	0.01	
C212	ECUV1C475ZF	4.7	
C214	ECUV1H103KBV	0.01	
C220	ECUV1H100DCV	10P	S
C222	PQCUV1H104ZF	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C223	ECEA1HKS100	10	
C224	ECUV1H681JCV	680P	
C226	ECUV1H100DCV	10P	S
C228	ECUV1H104ZFV	0.1	S
C229	ECUV1H104ZFV	0.1	S

11.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP4FP85C	OPERATION BOARD ASS'Y (RTL)	
		Refer to OPERATION PANEL SECTION().	
		(ICS)	
IC301	MN7D032Z9J	IC	
IC302	PFVINJM2904M	IC	
		(DIODE)	
LED303	LNJ801LPDJA	DIODE(SI)	
		(CONNECTORS)	
CN301	PQJP11G43Y	CONNECTOR,11PIN	
CN303	PQJP3G43Z	CONNECTOR,3PIN	
		(SWITCHES)	
SW352	PFSH1A002Z	SWITCH, DOCUMENT TOP	
SW353	PFSH1A002Z	SWITCH, DOCUMENT TOP	
		(LIQUID CRYSTAL DISPLAY)	
CN302	PFAVM190B	LIQUID CRYSTAL DISPLAY	
		(RESISTORS)	
R301	ERJ3GEYJ471	470	
R302	ERJ3GEYJ471	470	
R303	ERJ3GEYJ273	27k	
R305	ERJ3GEYJ681	680	
R312	ERJ3GEYJ271	270	
R314	ERJ3GEYJ472	4.7k	
R315	ERJ3GEYJ101	100	
R316	ERJ3GEYJ472	4.7k	
R317	ERJ3GEYJ101	100	
R318	ERJ3GEYJ4R7	4.7	
R351	ERJ3GEYJ331	330	
R352	ERJ3GEYJ682	6.8k	
R353	ERJ3GEYJ123	12k	
R354	ERJ3GEYJ682	6.8k	
R355	ERJ3GEYJ223	22k	
R356	ERJ3GEYJ334	330k	
R357	ERJ3GEYJ222	2.2k	
R385	ERJ3GEYJ331	330	
		(CAPACITORS)	
C302	ECUV1C104KBV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C303	ECEA0JKS101	100	
C304	ECUV1C104KBV	0.1	S
C305	ECUV1H101JCV	100P	
C308	ECUV1H331JCV	330P	
C309	ECUV1H331JCV	330P	
C310	ECUV1C104KBV	0.1	S
C311	ECUV1C104KBV	0.1	S
C314	ECUV1C104KBV	0.1	S
C316	ECUV1H103KBV	0.01	
C317	ECUV1H103KBV	0.01	
C352	ECEA0JKS101	100	
C353	ECUV1H153KBV	0.015	
C354	ECUV1C104KBV	0.1	S
C355	ECUV1H181JCV	180P	
C356	ERJ3GEY0R00	0	
C357	ECUV1C104KBV	0.1	S
C369	ECEA0JKS101	100	
		(SWITCHES)	
SW302	PQSH1A105Z	SWITCH	
SW303	PQSH1A105Z	SWITCH	
SW304	PQSH1A105Z	SWITCH	
SW305	PQSH1A105Z	SWITCH	
SW306	PQSH1A105Z	SWITCH	
SW307	PQSH1A105Z	SWITCH	
SW308	PQSH1A105Z	SWITCH	
SW309	PQSH1A105Z	SWITCH	
SW310	PQSH1A105Z	SWITCH	
SW311	PQSH1A105Z	SWITCH	
SW312	PQSH1A105Z	SWITCH	
SW313	PQSH1A105Z	SWITCH	
SW314	PQSH1A105Z	SWITCH	
SW315	PQSH1A105Z	SWITCH	
SW316	PQSH1A105Z	SWITCH	
SW317	PQSH1A105Z	SWITCH	
SW318	PQSH1A105Z	SWITCH	
SW319	PQSH1A105Z	SWITCH	
SW320	PQSH1A105Z	SWITCH	
SW321	PQSH1A105Z	SWITCH	
SW322	PQSH1A105Z	SWITCH	
SW323	PQSH1A105Z	SWITCH	
SW324	PQSH1A105Z	SWITCH	
SW326	PQSH1A105Z	SWITCH	
SW327	PQSH1A105Z	SWITCH	
SW328	PQSH1A105Z	SWITCH	
SW329	PQSH1A105Z	SWITCH	
SW330	PQSH1A105Z	SWITCH	
SW331	PQSH1A105Z	SWITCH	
SW333	PQSH1A105Z	SWITCH	
SW334	PQSH1A105Z	SWITCH	
SW335	PQSH1A105Z	SWITCH	
SW351	EVEGB141112B	SWITCH	

11.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1282EZL	POWER SUPPLY BOARD ASS'Y / (RTL)	⚠
		(ICS)	
IC101	PFVIFA5317P	IC	
IC201	AN1431T	IC	
IC202	PFVITA7805F	IC	S
		(TRANSISTORS)	
Q101	2SK2651	TRANSISTOR(SI)	⚠
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	⚠S
D102	PFVD1N4005	DIODE(SI)	⚠S
D103	PFVD1N4005	DIODE(SI)	⚠S
D104	PFVD1N4005	DIODE(SI)	⚠S
D105	PFVDEG01C	DIODE(SI)	S
D106	MA165	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PQVDERA1802	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVDD1NL20U	DIODE(SI)	S
		(COIL)	
L101	ELF15N006A	COIL	⚠
		(COMPONENTS PARTS)	
L103	EXCELDR35	COMPONENTS PARTS	
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2 PIN	⚠
CN301	PQJP7G30Z	CONNECTOR, 7 PIN	⚠
		(FUSE)	
F101	PQBA2C31TRLW	FUSE	⚠S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	PFVIPC123	PHOTO ELECTRIC TRANSDUCER	⚠S
		(THERMISTOR)	
TH101	PFRT57235S80	THERMISTOR	S
		(TRANSFORMER)	
T101	PFLTSRW292ED	TRANSFORMER	⚠S
		(VARIABLE RESISTOR)	

Ref. No.	Part No.	Part Name & Description	Remarks
VR201	EVNDJAA03B53	VARIABLE RESISTOR	
		(VARISTOR)	
ZNR101	ERZV10DK751U	VARISTOR	⚠
		(RESISTORS)	
R101	ERDS1J105	1M	⚠
R102	ERDS2TJ394	390k	
R103	ERDS2TJ394	390k	
R104	ERG2SJ304	300k	
R105	ERX2SJR22	0.22	
R106	ERG2SJ470	47	
R107	ERG2SJ304	300k	
R108	ERDS2FJ150	15	
R109	ERDS2TJ100	10	
R121	PQ4R10XJ103	10k	S
R122	PQ4R10XJ271	270	
R124	PQ4R10XJ181	180	S
R125	PQ4R10XJ103	10k	S
R126	PQ4R10XJ562	5.6k	S
R127	PQ4R10XJ182	1.8k	S
R128	PQ4R10XJ101	100	S
R136	PQ4R10XJ104	100k	S
R137	PQ4R10XJ104	100k	S
R202	ERG2SJ152	1.5k	
R203	ERDS2FJ470	47	
R221	PQ4R10XJ222	2.2k	S
R222	PQ4R10XJ222	2.2k	S
R223	PQ4R10XJ101	100	S
R224	PQ4R10XJ273	27k	S
R225	PQ4R10XJ332	3.3k	S
		(CAPACITORS)	
C101	ECQU2A224MG	0.22	⚠
C102	ECQU2A104MG	0.1	⚠
C103	PFKDE2GA102K	0.001	S
C105	PFKDE2GA222M	0.0022	⚠
C106	PFCEA400SX56	56	S
C108	ECKD3A102KBP	0.001	
C109	ECA1VHG470	47	
C110	PFKDD2GA222M	0.0022	S
C119	ECKD3A470KBP	47P	S
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	ECUV1H561KBN	560P	
C124	ECUV1E104KBX	0.1	S
C201	PFCEA35F471	470	S
C202	ECKD3A102KBP	0.001	
C203	PFCEA16A470	470	S
C204	PFCEA35A47M	47	S
C205	PFCEA50A47M	0.47	S
C206	ECKD3A102KBP	0.001	

Ref. No.	Part No.	Part Name & Description	Remarks
C221	ECUV1E104KBX	0.1	

11.6. RS232C BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PFLP1228MZ	RS232C BOARD ASS'Y (RTL)	
		(CONNECTORS)	
CN1	PFJS25A05Y	CONNECTOR, 25P	
CN2	PQJP11G43Y	CONNECTOR, 11P	

11.7. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ2K12Z	CONNECTOR, 2P	
EC2	PFZZ10K1Z	CONNECTOR, 10P	
EC3	PFZZ17K2Z	CONNECTOR, 17P	
EC4	PQZZ7K5Z	CONNECTOR, 7P	
EC5	PFZZ11K13Z	CONNECTOR, 11P	
EC6	PFZZ5K13Z	CONNECTOR, 5P	
EC7	PQZZ11K4Z	CONNECTOR, 11P	
EC8	PQZZ2K13Z	CONNECTOR, 2P	
EC9	PFZZ10K3Z	CONNECTOR, 10P	
EC10	PQZZ3K8Z	CONNECTOR, 3P	
EC11	PFZZ11K12Z	CONNECTOR, 11P	
EC20	PFZZFP85M	VOICE PROMPT ROM	
		(for KX-FM189BL)	
EC20	PFZZFM189S	VOICE PROMPT ROM	
		(for KX-FM189S)	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE	
		(for training service technicians)	

Note:

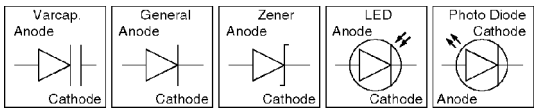
Tools and Extension Cords are useful for servicing.
(They make servicing easy.)

12. FOR THE SCHEMATIC DIAGRAMS

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

3.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

13. PRINTED CIRCUIT BOARD

13.1. DIGITAL BOARD: BOTTOM VIEW

13.2. DIGITAL BOARD: COMPONENT VIEW

13.3. ANALOG BOARD: BOTTOM VIEW

13.4. ANALOG BOARD: COMPONENT VIEW

13.5. OPERATION BOARD

13.6. POWER SUPPLY BOARD

14. SCHEMATIC DIAGRAM

14.1. DIGITAL BOARD

14.2. ANALOG BOARD (for KX-FM189BL)

14.3. ANALOG BOARD (for KX-FM189S)

14.4. OPERATION BOARD

14.5. POWER SUPPLY BOARD

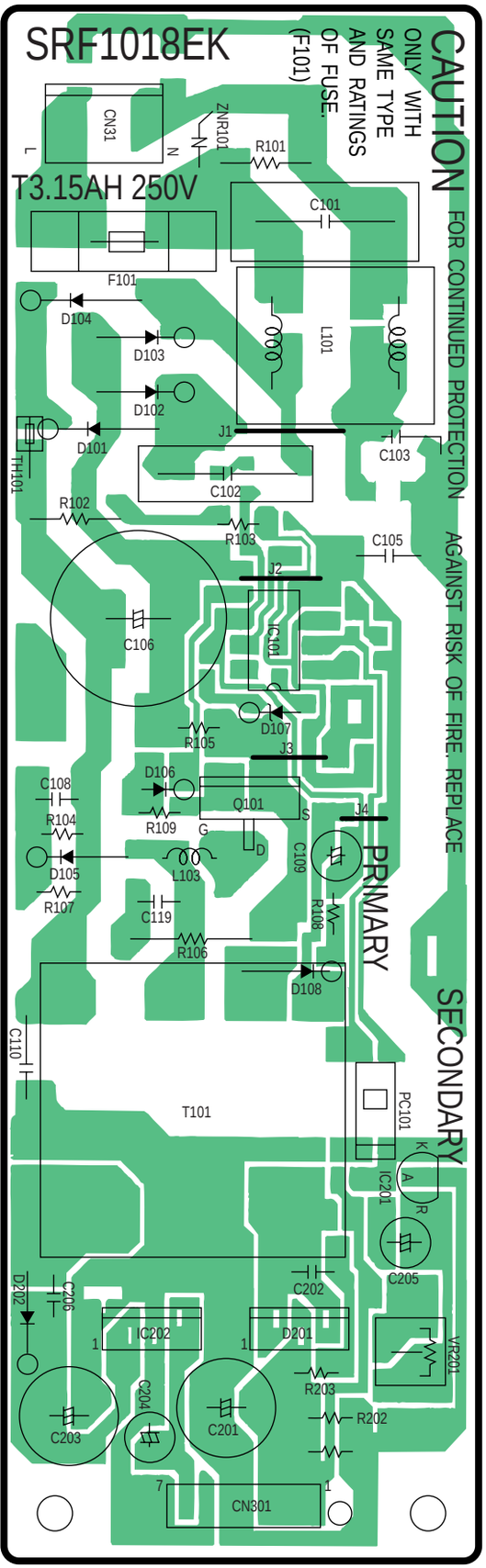
14.6. RS232C BOARD

14.6.1. PRINTED CIRCUIT BOARD

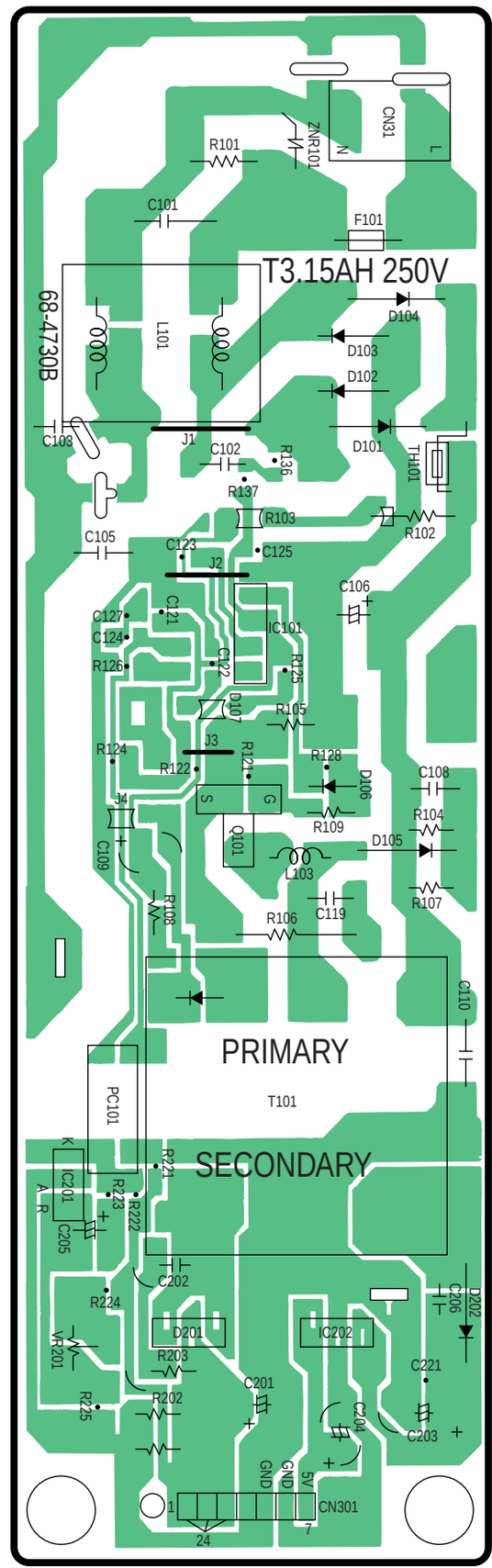
14.6.2. SCHEMATIC DIAGRAM

TN / KXFM189BL / KXFM189S

(COMPONENT VIEW)



(BOTTOM VIEW)



FAX TX Signal
FAX RX Signal

TO POWER UNIT
CN506

THDAT
THCLK
THLAT
STB1
STB2

TO THERMAL HEAD
CN505

TO MOTOR
CN502

TX0
TX1
TX2
TX3
TXE

TO RS-232C D-SUB 25PIN
CN508

XCTS
RXD
XDSR
XRTS
TXD
DCD
XDTR

IC504
IC502
IC503
IC512
IC506
IC508
IC520
IC521
IC501
IC505
IC513
IC522
IC514

24MHz
32.768KHz
32.256MHz

KRXD/KTXD
KSCLK
KLATCH
KSTART

TO OPERATION PANEL
TO OPEPANE MIC
TO CIS
CLK
SI

Not Used

CN501
CN507
CN503
CN504
CN509

MDMRST
MPOS
ACK
TEST
CPUCLK
YTEST
20KOSC
OPRESE
R_P
CLE
ALE
FCS
CISSEL
HOOK
CSI
CCLK
CBUSY1
CSO
CBUSY2
SPMUTE
MLAT
MCLK
MDAT
VOX
VLREF
TONE1EN
CRESET
SIG
ETG
FI
LINERLY
DCN
CISLEDON
SD
EXHOOK1
TXD
RXD
XRTS
XCTS
DSR
DCD
XDTR
PTOP
FILMEND
SENLEDON
AMON
JOG1
JOG2
MICIN
VIDEO
MONRX
LINERX
LINETX
SPOUT
HSTX+
HSTX-
HSRX+
HSRX-
24V
5VA
AG
5VD
DG
EXHOOK1
BELL
LINERLY
DCN
SPMUTE
HOOK
MPOS
LINERX
LINETX
SPOUT
HSTX(+)
HSTX(-)
HSRX(+)
HSRX(-)
24V
5VA
AG
MONRX
CSI
CSO
CCLK
CBUSY1
CBUSY2
CRESET
S_ENB
SIDETONE/S-ENB(O)
E-RECALL(O)/CCLK(I)
HS-ALC/CBUSY1(I)
P-SHORT/CBUSY2(O)
DTMFINP/CRESET(O)

FAX TX Signal
FAX RX Signal

TO LINE

TO EXT-TEL

TO SP

(TAX PULSE FILTER)
Optional

(TAX PULSE FILTER)
Optional

Optional

HANDSET, MONITOR
FAX RX
2.0V

HANDSET
FAX TX
12V

(DTMF RETURN LOSS)
Not Used

(Auto Disconnect)

(EARTH RECALL)
Not Used

(FRANCE C-ID)
Not Used

Not Used

SIDE_TONE
DTMFIMP
EX_HOOK1
HS_ALC
P_SHORT
DCN
E_RECALL/F CID
LINE_RLY
BREAK
BELL
EX_HOOK2
HOOK
MPOS
SPMUTE

CN101
1 EX_HOOK1
2 BELL
3 LINE_RLY
4 DCN
5 SPMUTE
6 HOOK
7 MPOS
8 LINEIN
9 LINEOUT
10 SPOUT
11 HSTX(+)
12 HSTX(-)
13 HSRX(+)
14 HSRX(-)
15 +24V
16 +5VA
17 AG

CN106
1 +5VD
2 DG
3 MONITOR
4 EXHOOK2/CSI(I)
5 BREAK/CSO(O)
6 E_RECALL/CCLK(O)
7 HS_ALC/BUSY1(I)
8 P_SHORT/CIBUSY2(O)
9 DTMFIMP/CRESET(O)
10 SIDE_TONE/S_ENB(O)

CN102
1 a1
2 E(G)
3 a
4 b
5 S(W)
6 b1

CN103
1 b1
2 S(W)
3 b
4 a
5 E(G)
6 a1

CN104
1 HSMIC(-)
2 HSSP(+)
3 HSSP(-)
4 HSMIC(+)

CN105
1 SP[+]
2 SP[-]

FAX TX Signal
FAX RX Signal

(TAX PULSE FILTER) Not Used

2.0V
HANDSET, MONITOR
FAX RX

12V
HANDSET
FAX TX

(TAX PULSE FILTER)

TO LINE
CN102

(Auto Disconnect)

(EARTH RECALL)
Not Used

Not Used
(FRANCE C-ID)

(DTMF RETURN LOSS)
Not Used

TO SP
CN105

TO EXT-TEL
CN103

Not Used

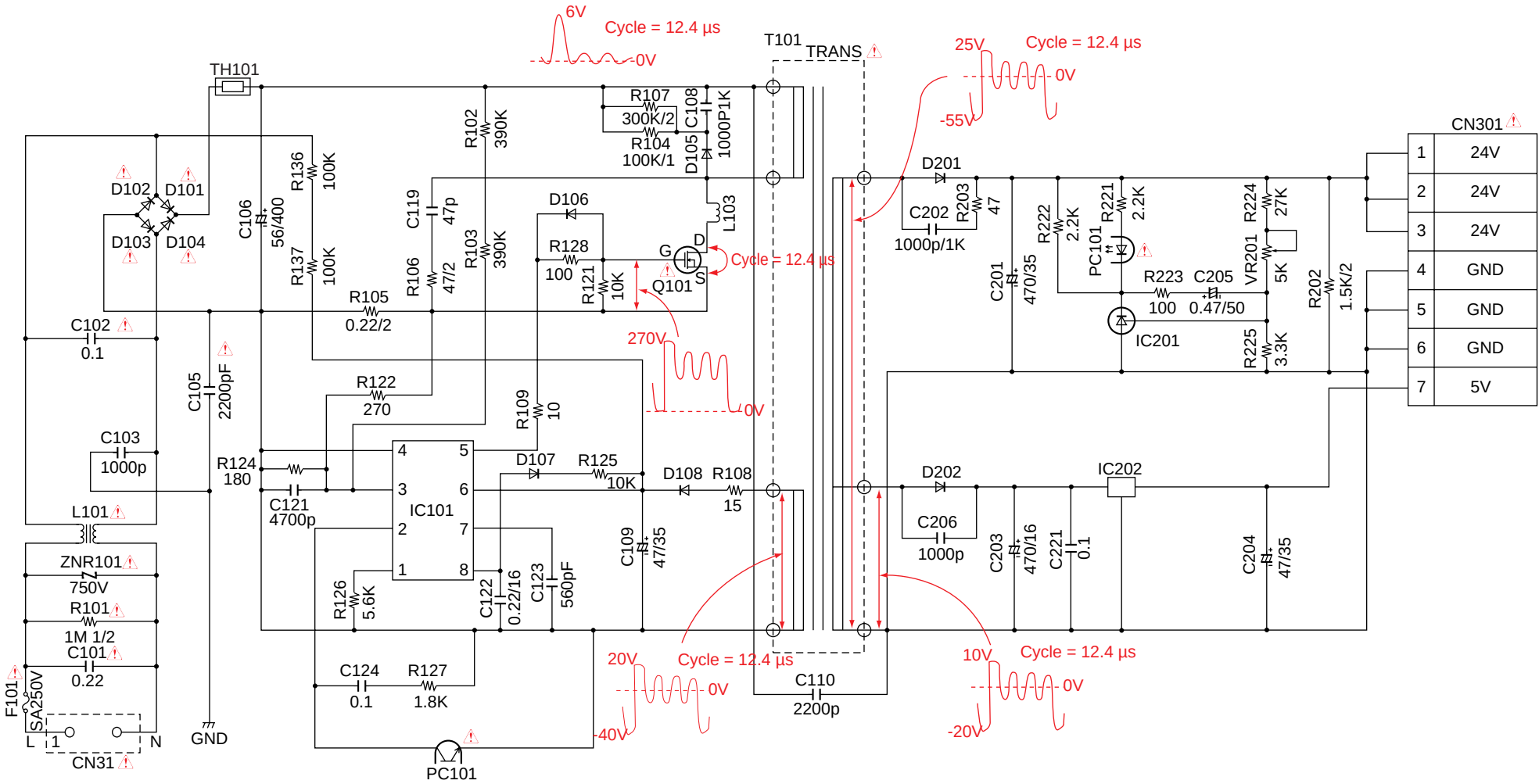
CN101
EX_HOOK1
BELL
LINE_RLY
DCN
SPMUTE
HOOK
MPOS
LINEIN
LINEOUT
SPOUT
HSTX(+)
HSTX(-)
HSRX(+)
HSRX(-)
+24V
+5VA
AG

CN106
+5VD
DG
MONITOR
EXHOOK2/CSI(I)
BREAK/CSO(O)
E_RECALL/CCLK(O)
HS_ALC/CBUSY1(I)
P_SHORT/CBUSY2(O)
DTMFIMP/CRESET(O)
SIDE_TONE/S_ENB(O)
EX_HOOK2
BREAK
E_RECALL/F_CID
HS_ALC
P_SHORT
DTMFIMP
SIDE_TONE

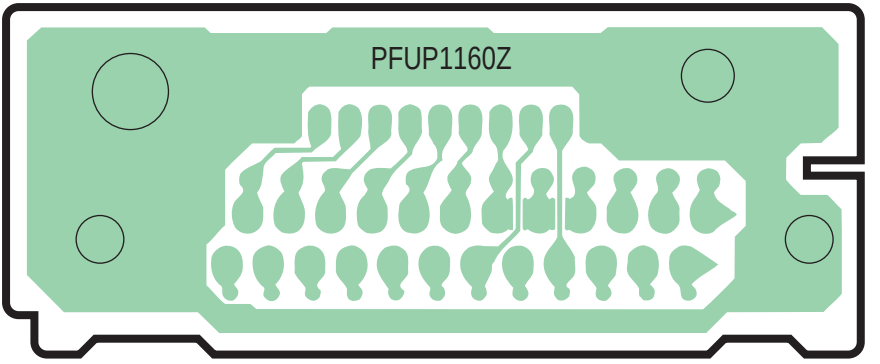
SIDE_TONE
DTMFIMP
EX_HOOK1
HS_ALC
P_SHORT
DCN
E_RECALL/F_CID
LINE_RLY
BREAK
BELL
EX_HOOK2
HOOK
MPOS
SPMUTE

CN104
HSMIC(-)
HSSP(+)
HSSP(-)
HSMIC(+)

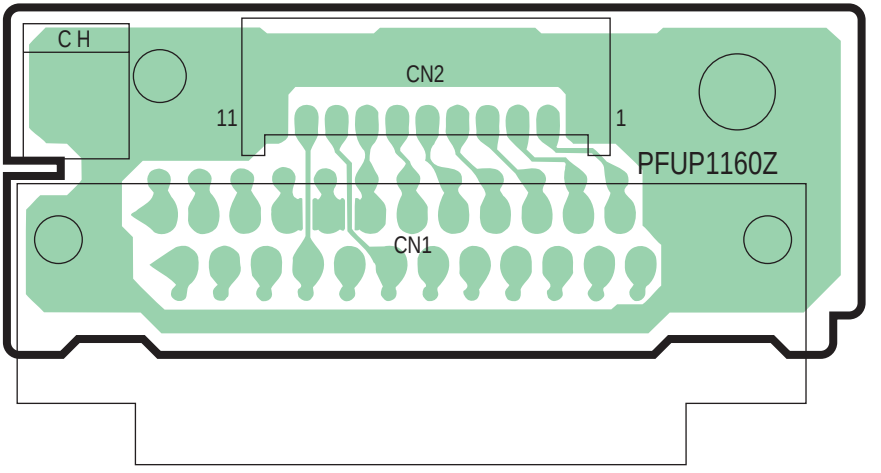
TO DIGITAL
CN301
5V
0V
RESET 11
KSCLK 10
KTXD 9
KRXD 8
KLATCH 7
KSTART 6
JOG1 5
JOG2 4
+5V 3
GND 2
MICIN 1
R301 470
R376
R302 470
R375
SW351
JOG DIAL
1 JOG1
2 GND
3 JOG2
C304 Z0.1u
C360
C305 J100p
C361
C308 J330p
C362
C309 J330p
C363
+5V1
R384
C359
C301
C358
C302 Z0.1u
C303 6.3V 100u
TO DIGITAL
CN303
MICIN 1
2
GND 3
J331
+5V3
+5V2
+5V1
C365
C311 Z0.1u
C364
C310 Z0.1u
IC301
30 RESET
31 SCLK
32 RXD
33 TXD
34 LATCH
35 START
42 KIN0
3 KIN1
7 KIN2
8 KIN3
11 KIN4
12 KIN5
13 KIN6
14 KIN7
43 KSL0
44 KSL1
1 KSL2
10 KSL3
4 KSL4
9 XL10
18 GND
39 GND
VDD 17
VDD 40
LED6 2
LED1 22
RS 23
R/W 24
E 25
D4 26
D5 27
D6 28
D7 29
LED2 36
LED3 37
LED4 38
LED5 41
XL8 5
XL9 6
XL12 15
XL11 16
XL13 19
XL14 20
XL15 21
LCD CONTRAST
+5V2
R304
R378
R305 680
R379
R377
R303 27K
5V
0V
TO LCD
CN302
1 GND
2 +5V
3 V0
4 RS
5 R/W
6 E
7 D0
8 D1
9 D2
10 D3
11 D4
12 D5
13 D6
14 D7
TO COB
R318 47
R386
NC
C366
NC
C314 Z0.1u
R319
NC
R320
NC
0V
LED: ON
5V
LED: OFF
MENU SW306
9 SW311
* SW316
RECORD SW321
0 SW326
ERASE SW331
SW301
HELP SW302
MUTE SW307
5 SW312
4 SW317
6 SW322
PLAY MESSAGES SW327
LOCATOR SW332
VOL+ SW303
COLLATE SW308
2 SW313
1 SW318
RESOLUTION SW323
CALLER ID SW328
3 SW333
VOL- SW304
QUICK SCAN SW309
COPY/START/SET SW314
REDIAL/PAUSE SW319
SP-PHONE SW324
FLASH SW329
STOP SW334
AUTO ANSWER SW305
IQ-FAX SW310
8 SW315
7 SW320
INTERCOM SW325
DIRECTORY PROGRAM SW330
SW335
+5V2
IN USE1
LED301
R310
IN USE2
LED302
R311
NEW MESSAGES
LED303
R312 270
5V
0V
+5V2
R316 4.7k
R381
R380
R317 100
SW353
C367
C317 K0.01u
DOCUMENT TOP SW
+5V2
R314 4.7k
R383
R382
R315 100
SW352
C368
C316 K0.01u
DOCUMENT SET SW
+5V3
R385 330
IC302 -2
C369 6.3V 100u
C357 Z0.1u
C355 J180p
R356 330k
C356 0
R355 22k
C353 K0.015u
IC302 -1
+5V3
R357 2.2k
R353 12k
C354 Z0.1u
R354 6.8k
+5V3
R351 330
R352 6.8k
C352 6.3V 100u
TO MIC
MIC (+)
MIC (-)
C351
NC.....Not Used

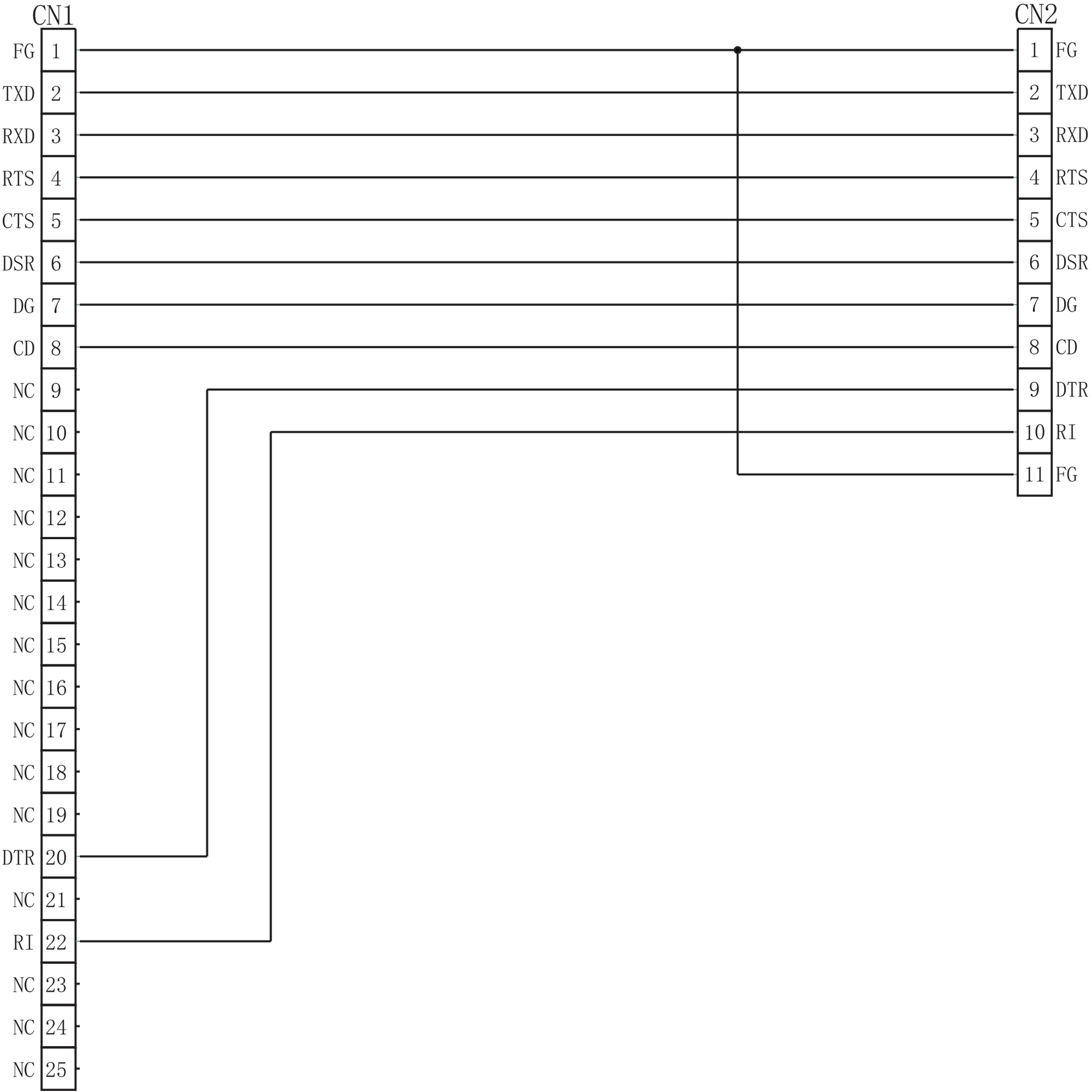

TH101
T101
TRANS
CN301
1 24V
2 24V
3 24V
4 GND
5 GND
6 GND
7 5V
D102 D101 D103 D104
C106 56/400
R136 100K
R137 100K
R102 390K
R107 300K/2
R104 100K/1
C108 1000P1K
D105
L103
C119 47p
R106 47/2
R103 390K
D106
R128 100
R121 10K
G D S
Q101
Cycle = 12.4 µs
6V
0V
270V
0V
R105 0.22/2
C102 0.1
C105 2200pF
R122 270
R109 10
C103 1000p
R124 180
C121 4700p
IC101
D107
R125 10K
D108
R108 15
L101
ZNR101 750V
R101 1M 1/2
C101 0.22
F101 SA250V
L 1 N
CN31
GND
R126 5.6K
C122 0.22/16
C123 560pF
C109 47/35
C124 0.1
R127 1.8K
PC101
20V
0V
-40V
Cycle = 12.4 µs
C110 2200p
25V
0V
-55V
Cycle = 12.4 µs
D201
C202 1000p/1K
R203 47
C201 470/35
R222 2.2K
PC101
R221 2.2K
R223 100
C205 0.47/50
IC201
R224 27K
VR201 5K
R225 3.3K
R202 1.5K/2
D202
C206 1000p
IC202
C203 470/16
C221 0.1
C204 47/35
10V
0V
-20V
Cycle = 12.4 µs

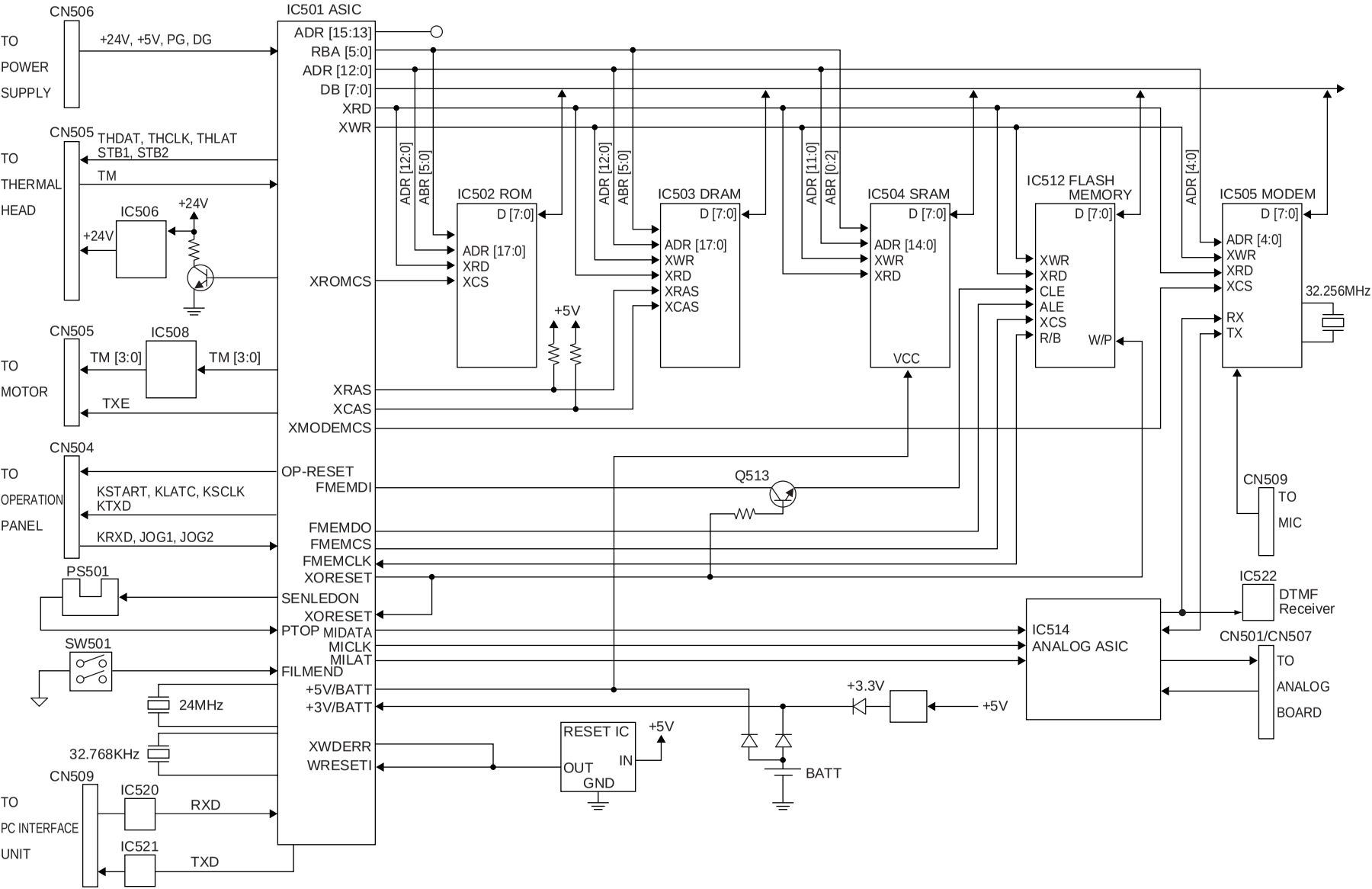
(COMPONENT VIEW)

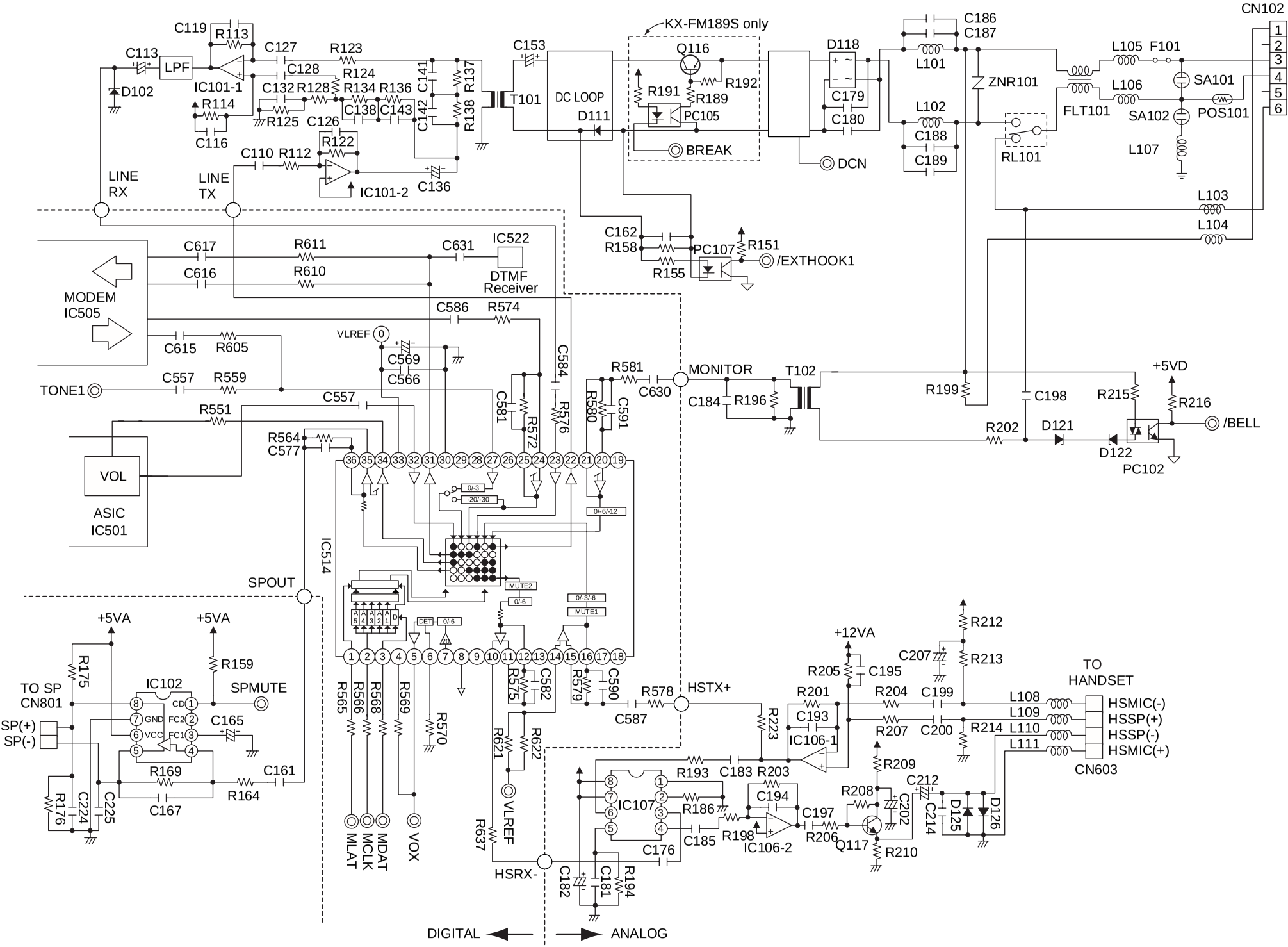


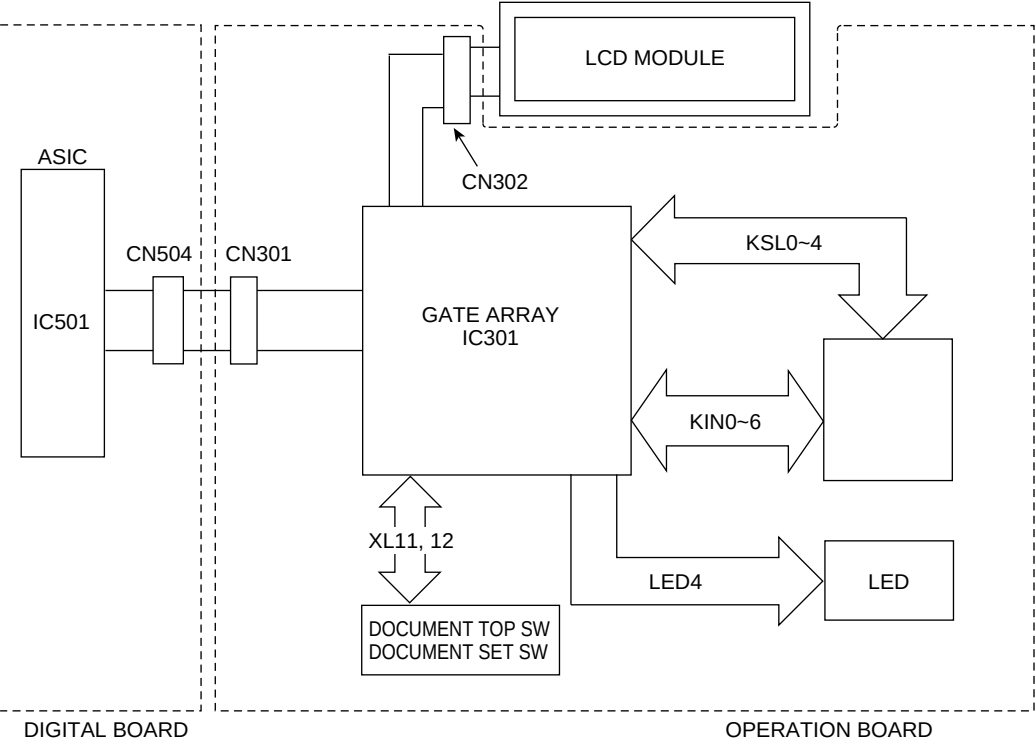
(BOTTOM VIEW)

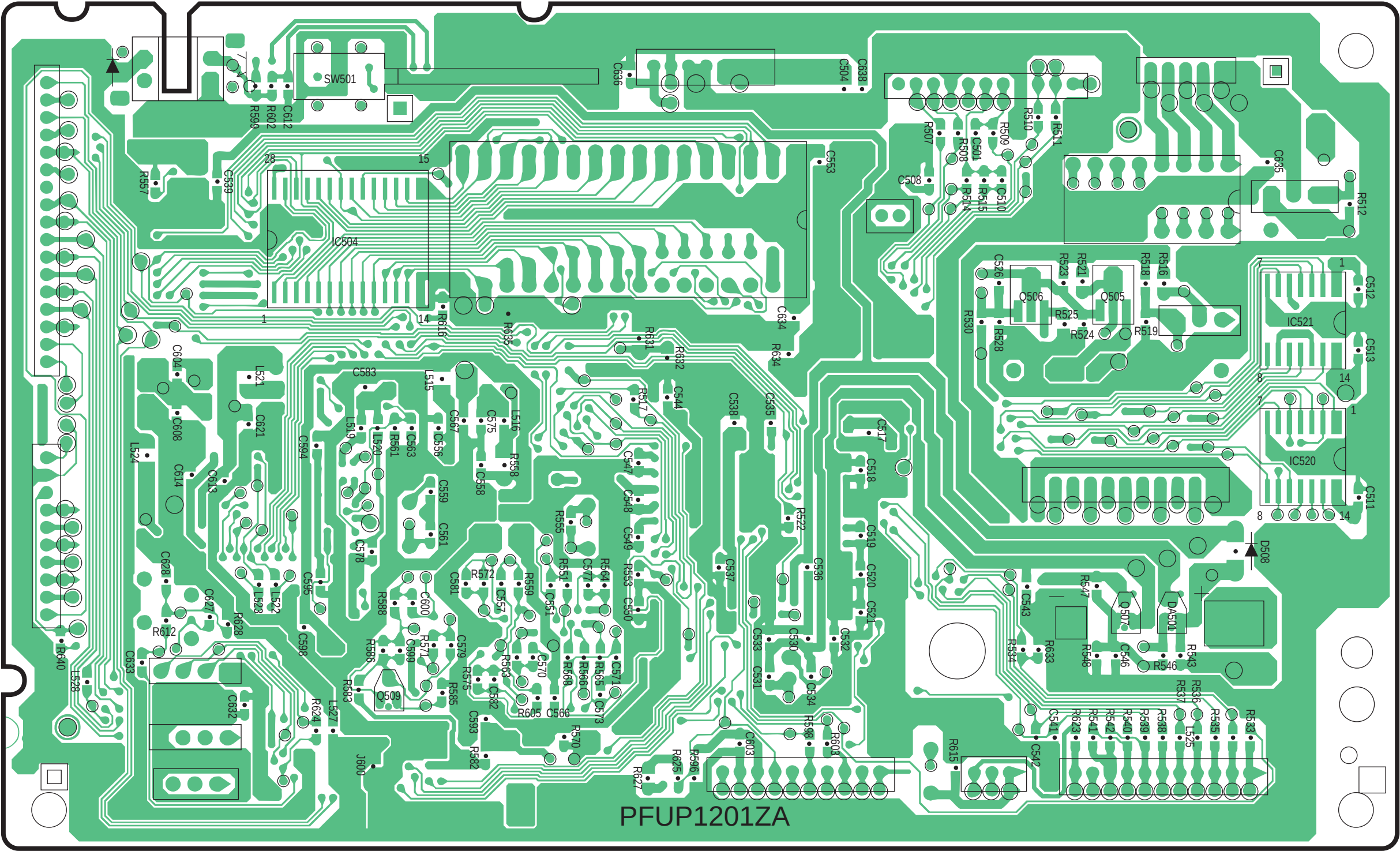


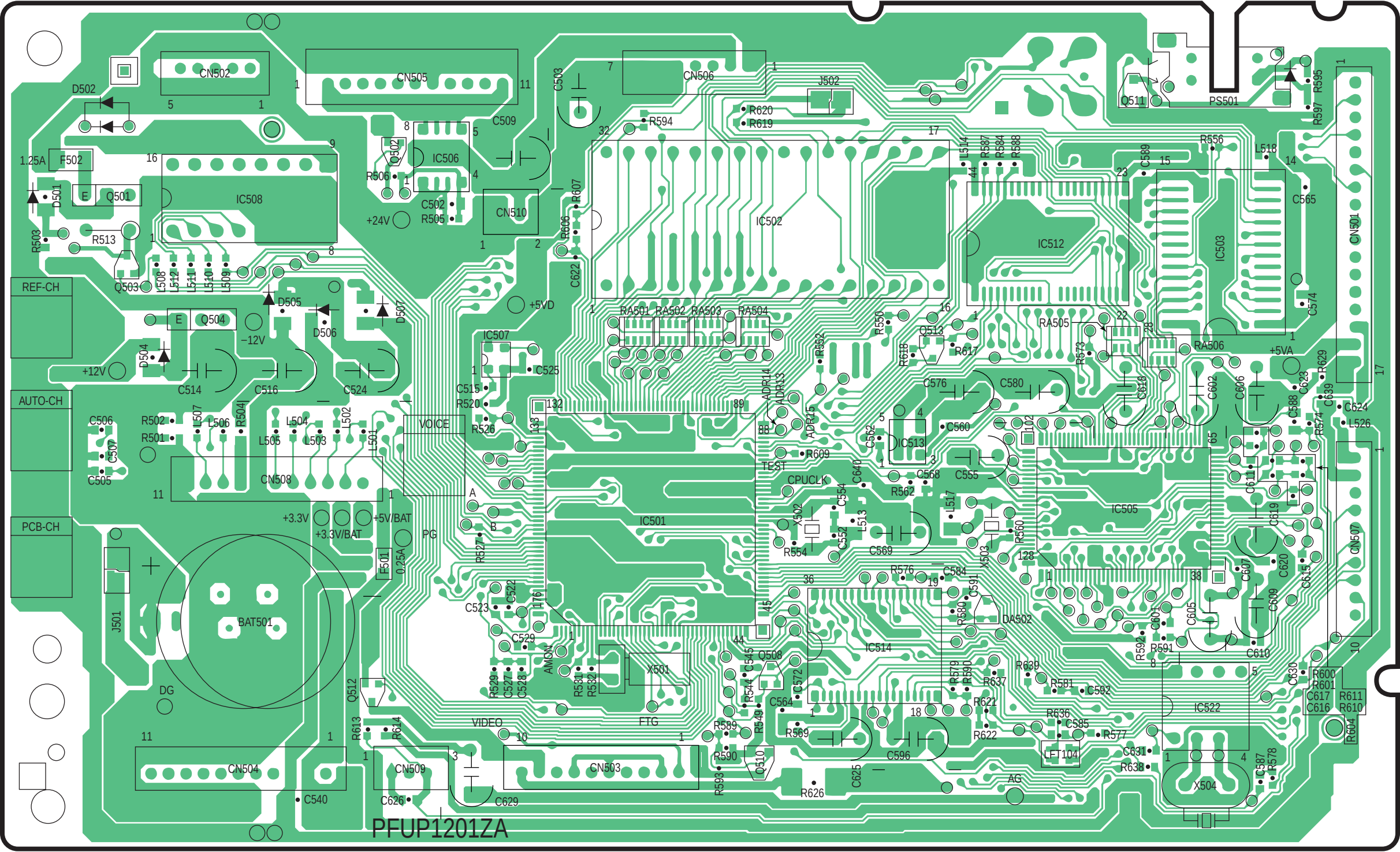

CN1
FG 1
TXD 2
RXD 3
RTS 4
CTS 5
DSR 6
DG 7
CD 8
NC 9
NC 10
NC 11
NC 12
NC 13
NC 14
NC 15
NC 16
NC 17
NC 18
NC 19
DTR 20
NC 21
RI 22
NC 23
NC 24
NC 25
CN2
1 FG
2 TXD
3 RXD
4 RTS
5 CTS
6 DSR
7 DG
8 CD
9 DTR
10 RI
11 FG

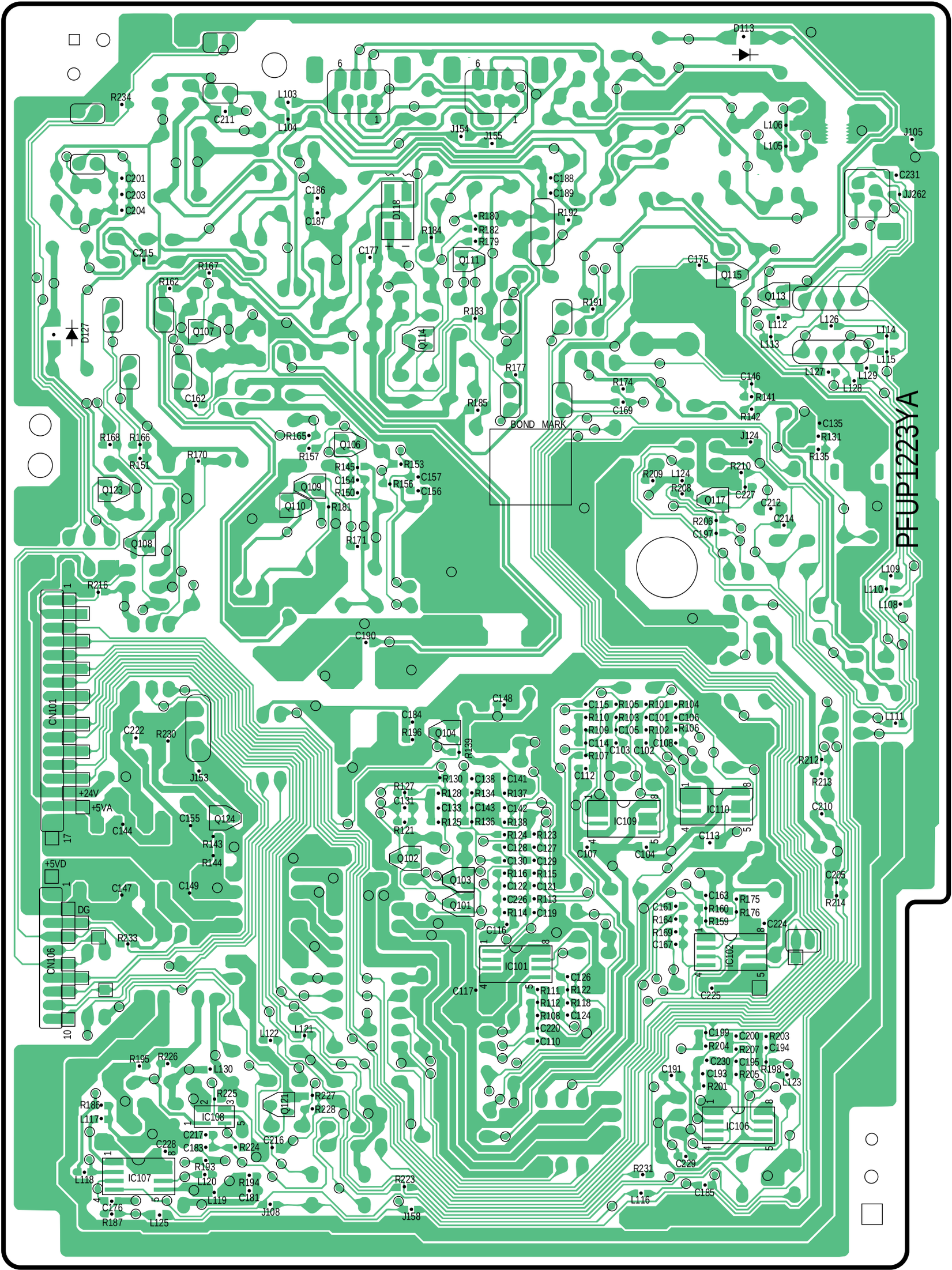

CN506
TO
POWER
SUPPLY
+24V, +5V, PG, DG
CN505
TO
THERMAL
HEAD
THDAT, THCLK, THLAT
STB1, STB2
TM
IC506
+24V
+24V
CN505
TO
MOTOR
IC508
TM [3:0]
TM [3:0]
TXE
CN504
TO
OPERATION
PANEL
KSTART, KLATC, KSCLK
KTXD
KRXD, JOG1, JOG2
PS501
SW501
24MHz
32.768KHz
CN509
TO
PC INTERFACE
UNIT
IC520
RXD
IC521
TXD
IC501 ASIC
ADR [15:13]
RBA [5:0]
ADR [12:0]
DB [7:0]
XRD
XWR
XROMCS
XRAS
XCAS
XMODEMCS
OP-RESET
FMEMDI
FMEMDO
FMEMCS
FMEMCLK
XORESET
SENLEDON
XORESET
PTOP MIDATA
MICLK
MILAT
FILMEND
+5V/BATT
+3V/BATT
XWDERR
WRESETI
ADR [12:0]
ABR [5:0]
IC502 ROM
D [7:0]
ADR [17:0]
XRD
XCS
+5V
ADR [12:0]
ABR [5:0]
IC503 DRAM
D [7:0]
ADR [17:0]
XWR
XRD
XRAS
XCAS
ADR [11:0]
ABR [0:2]
IC504 SRAM
D [7:0]
ADR [14:0]
XWR
XRD
VCC
IC512 FLASH
MEMORY
D [7:0]
XWR
XRD
CLE
ALE
XCS
R/B
W/P
ADR [4:0]
IC505 MODEM
D [7:0]
ADR [4:0]
XWR
XRD
XCS
RX
TX
32.256MHz
Q513
CN509
TO
MIC
IC522
DTMF
Receiver
IC514
ANALOG ASIC
CN501/CN507
TO
ANALOG
BOARD
+3.3V
+5V
RESET IC
OUT
IN
GND
+5V
BATT

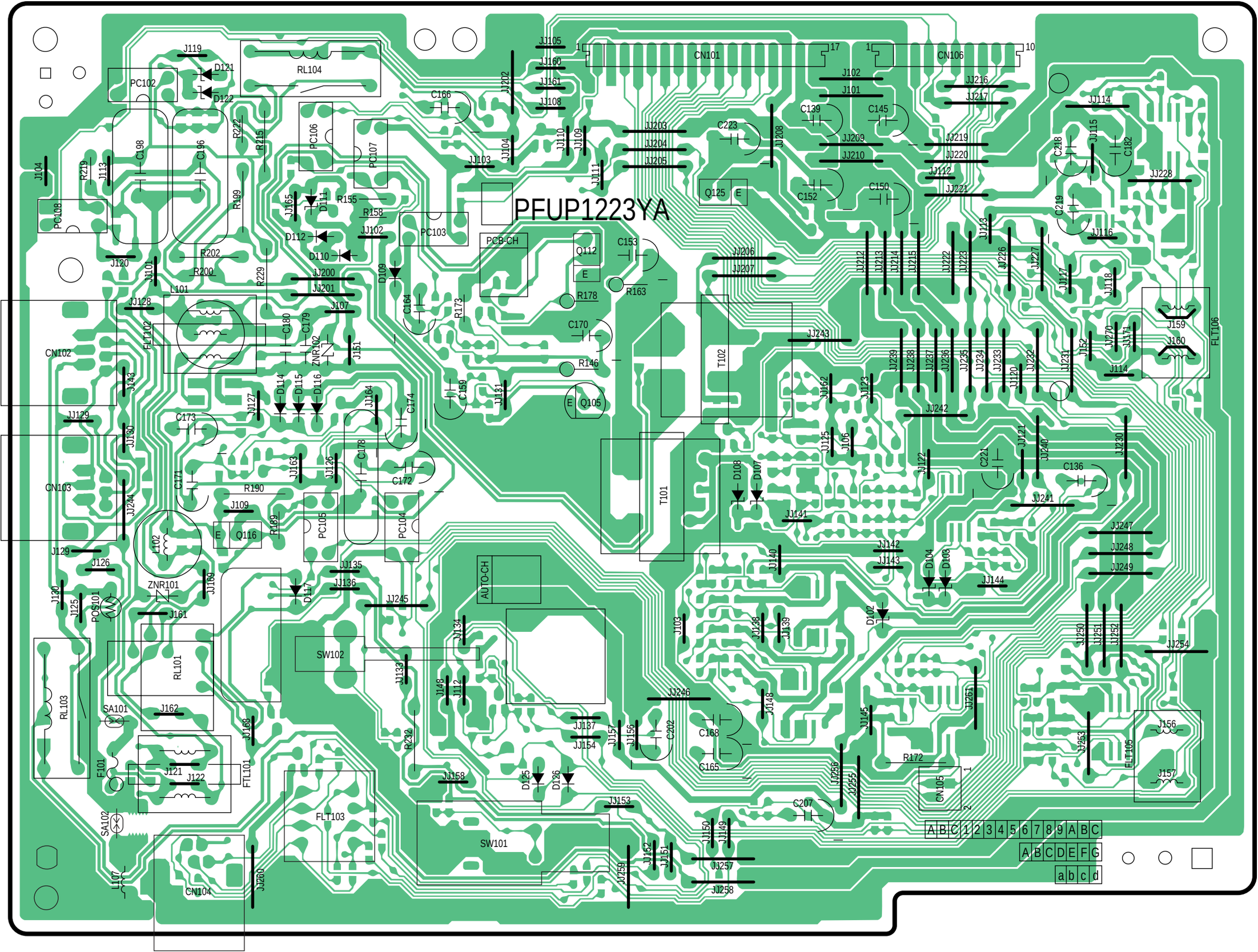

KX-FM189S only
CN102
LINE RX
LINE TX
IC101-1
IC101-2
LPF
T101
DC LOOP
D111
Q116
PC105
BREAK
DCN
D118
L101
L102
ZNR101
RL101
FLT101
L105
L106
L107
F101
SA101
SA102
POS101
L103
L104
PC107
/EXTHOOK1
MODEM IC505
IC522
DTMF Receiver
VLREF
TONE1
MONITOR
T102
/BELL
PC102
VOL
ASIC IC501
IC514
SPOUT
TO SP CN801
SP(+)
SP(-)
IC102
SPMUTE
MLAT
MCLK
MDAT
VOX
VLREF
HSRX-
HSTX+
IC107
IC106-1
IC106-2
Q117
TO HANDSET
HSMIC(-)
HSSP(+)
HSSP(-)
HSMIC(+)
CN603
DIGITAL
ANALOG


LCD MODULE
CN302
ASIC
IC501
CN504
CN301
GATE ARRAY
IC301
KSL0~4
KIN0~6
XL11, 12
LED4
LED
DOCUMENT TOP SW
DOCUMENT SET SW
DIGITAL BOARD
OPERATION BOARD

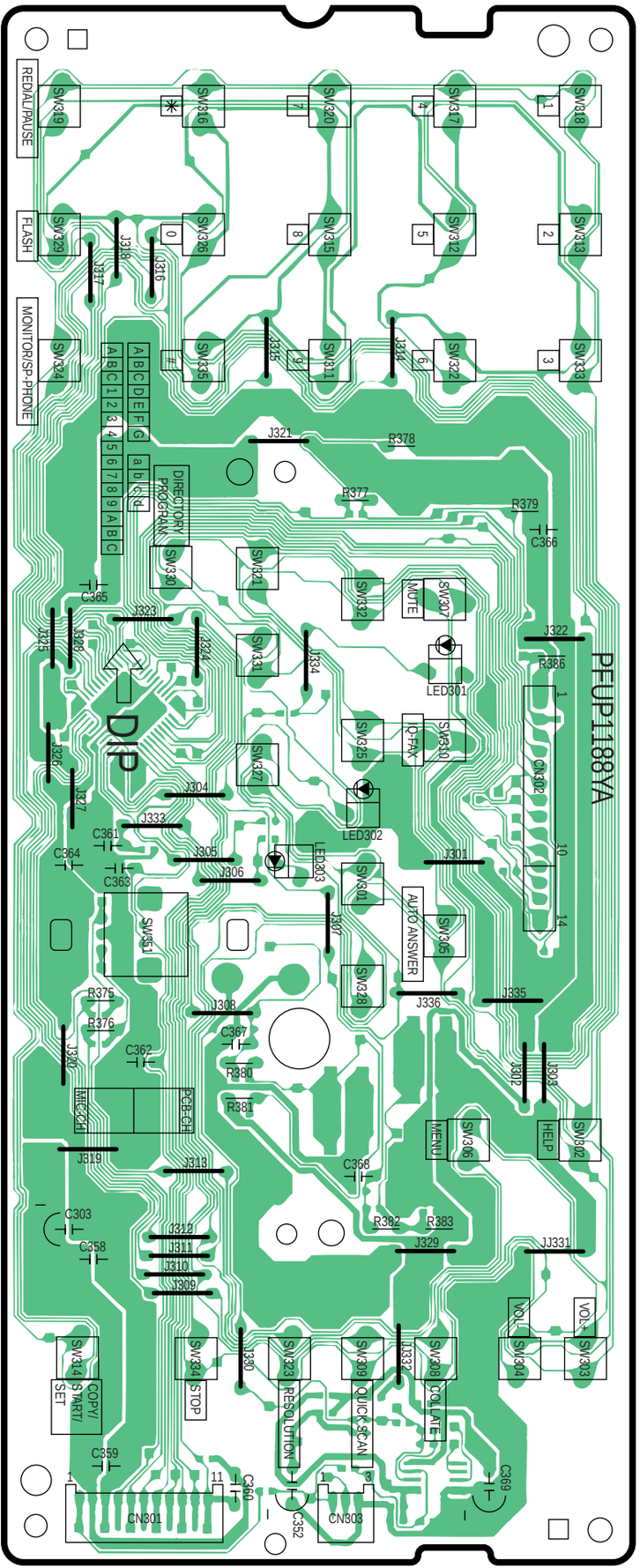

SW501
IC504
IC521
IC520
Q506
Q505
Q507
D508
DA501
PFUP1201ZA


PFUP1201ZA
REF-CH
AUTO-CH
PCB-CH
CN502
CN505
CN506
CN507
CN508
CN509
CN510
CN501
CN503
CN504
IC501
IC502
IC503
IC505
IC506
IC507
IC508
IC512
IC513
IC514
IC522
DA502
PS501
Q501
Q502
Q503
Q504
Q508
Q510
Q511
Q512
Q513
D501
D502
D503
D504
D505
D506
D507
F502
1.25A
E501
0.25A
BAT501
J501
J502
X501
X502
X503
X504
LFT104
VOICE
TEST
CPUCLK
FTG
VIDEO
AMON
PG
DG
AG
+24V
+12V
−12V
+5VD
+5VA
+3.3V
+3.3V/BAT
+5V/BAT


PFUP1223YA
BOND MARK
D113
J105
J154
J155
L103
L104
L105
L106
C211
R234
C201
C203
C204
C186
C187
D118
C188
C189
R192
R180
R182
R179
R184
C177
Q111
C175
Q115
Q113
C231
JJ262
C215
R167
R162
D127
Q107
R183
Q114
R191
L112
L113
L126
L114
L115
L127
L129
L128
C146
R141
R142
C135
R131
R135
C162
R177
R174
C169
R185
R168
R166
R151
R165
R157
Q106
R145
C154
R150
R153
R156
C157
C156
R170
Q123
Q109
Q110
R181
R171
Q108
J124
R210
R209
L124
R208
Q117
C227
C212
C214
R206
C197
R216
L109
L110
L108
C190
CN101
C222
R230
J153
+24V
+5VA
C155
Q124
C144
R143
R144
+5VD
C147
C149
DG
R233
CN106
C148
C184
R196
Q104
R139
R130
C138
C141
R127
R128
R134
R137
C131
C133
C143
C142
R125
R136
R138
R121
R124
R123
C128
C127
Q102
C130
C129
Q103
R116
R115
C122
C121
Q101
C226
R113
R114
C119
C116
IC101
C117
C126
R111
R122
R112
R118
R108
C124
C220
C110
C115
R105
R101
R104
R110
R103
C101
C106
R109
C105
R102
R106
C114
C103
C102
C108
R107
C112
IC109
C107
IC110
C104
C113
L111
R212
R213
C210
C205
R214
C161
R163
R175
R164
R160
R176
R169
R159
C224
C167
IC102
C225
C199
C200
R203
R204
R207
C194
C230
C195
R198
C191
C193
R205
L123
R201
IC106
C229
R231
C185
L116
R195
R226
L130
L122
L121
R225
R227
R228
Q121
R186
L117
IC108
C217
C228
C183
R224
C216
R193
L120
R194
L118
IC107
L119
C181
R223
C176
R187
L125
J108
J158


PFUP1223YA
CN101
CN106
CN102
CN103
CN104
CN105
PCB-CH
AUTO-CH
SW101
SW102
T101
T102
FLT101
FLT102
FLT103
FLT105
FLT106
RL101
RL103
RL104
L101
L102
L107
F101
SA101
SA102
POS101
ZNR101
ZNR102
Q105
Q112
Q116
Q125
A B C 1 2 3 4 5 6 7 8 9 A B C
A B C D E F G
a b c d

(COMPONENT VIEW)



(BOTTOM VIEW)